Entered as second-class matter at the Post Office at Easton, Pa., under the Act of March 3, 1879.

GENERAL LIBRARY
AUG 21 1920
UNIV. OF MICH.

AMERICAN JOURNAL OF PHARMACY

PUBLISHED MONTHLY BY THE
PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE
A RECORD OF THE PROGRESS OF PHARMACY AND THE ALLIED SCIENCES

PUBLICATION COMMITTEE
CHARLES H. LAWALL, PH.M. — GEORGE M. BERINGER, PH.M.
JOSEPH W. ENGLAND, PH.M. — JULIUS W. STURMER, PHAR.D.
JOHN K. THUM, PH.M. — E. FULLERTON COOK, PH.M.
ROBERT P. FISCHELIS, B.SC., PHAR.D.
GEORGE M. BERINGER, A.M., PH.M., Editor

VOL. 92 — AUGUST, 1920 — No. 8

CONTENTS

Editorial:
English Orthography 525
Denaturing Bay Rum 528
The Biologic Methods for Digitalis Assay. By Herbert C. Hamilton, Detroit, Mich. 529
Studies on Commercial Varieties of Nux Vomica. By H. W. Youngken, Ph.D., and C. F. Slotter, B.Sc., Philadelphia, Pa. 538
Making Use of National and State Bulletins upon Scientific Subjects. By Charles H. LaWall, Ph.M., Philadelphia, Pa. 540
Notes on Henna. By Benjamin H. Hollstein, Ph.C., Philadelphia, Pa. 543
Suggestions for United States Pharmacopoeial Revision Submitted by the Committee on the United States Pharmacopoeia of the Philadelphia College of Pharmacy. May, 1920. (*To be Continued*) 547
What of the Day? And What of the Future in Pharmacy? By Henry M. Whelpley, M.D., Ph.M., St. Louis, Mo. 563
Pharmaceutical Events in 1870. By Otto Raubenheimer, Ph.M., Brooklyn, N. Y. 565
Colloidal Preparations in Medicine. An Abstract of Articles in *The Prescriber* 575
The End of Simplified Spelling. From the *Montreal Pharmaceutical Journal* 579
The Selection of Glass for the Manufacture of Ampuls. By George E. Ewe, Philadelphia, Pa. 581
Economic Botany and Chemical Industry. By J. B. Farmer 586
Camphor Production in British Empire. By Alfred Nutting 590
Note on Opium Poisoning. By H. E. Hankin, M.A., D.Sc., and D. Chatterji 591
James E. Bartlett, a Sketch with Portrait 594
Current Literature:
Scientific and Technical Abstracts 596
News Items and Personal Notes:
The National Research Council 604
Catalogue of the Monsanto Chemical Works 605
H. K. Mulford Co.'s Picnic to Employees 606
Lehn & Fink, Inc., in New Building 606
Obituary:
Edwin McCurdy Boring 607

Price, $3.00 per Annum, in Advance. Issued Monthly. Single Numbers, 30 Cents. Back Numbers, 50 Cents.

Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917. Authorized March 15, 1920.

Address all communications:
Publication Office—207 Church Street, Easton, Pa.
For the Editor; To American Journal of Pharmacy,
145 North Tenth Street, Philadelphia, Pa.
For the Business Manager: To Harold J. LaWall, Business Mgr.,
207 Church Street, Easton, Pa., or 145 North Tenth Street, Philadelphia, Pa.

Classified Advertisments

It will pay you to make use of this Department if you desire to buy or sell a store, any fixtures or apparatus, if you want to employ a clerk, chemist, or laboratory assistant, or if you are seeking a position.

RATES: 5 lines or less, one insertion $2.00; each additional line 40 cents. Payment to accompany order. Address: BUSINESS MANAGER, AMERICAN JOURNAL OF PHARMACY, 145 North 10th Street, Philadelphia, Pa.

SPECIAL ATTENTION: If you want to sell your drug, store, or buy one in any State, or want any kind of position, or need any kind of employee, or need a doctor, dentist or veterinarian, write F. V. Kniest, R. P. Bee Bldg., Omaha, Neb., Established 1904.

PHARMACIST

Experienced in analysis, chemical manufacturing and tablet compressing wants position. Write

HOSSMAN

435 W. School Lane
Germantown, Phila.

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

MANUSCRIPTS should be sent to the Editor. It should be stated in this connection that the Editor does not assume any responsibility in connection with the views or investigations of contributors, other than to exercise general care in the selection of matter.

Contributors are allowed a reasonable number of copies of this JOURNAL, free of charge, if applied for when the proof is returned.

REPRINTS, if desired, must be applied for when the proof is returned. The table below shows the *approximate* cost of reprints, the make-up of the pages to be identically the same as in the JOURNAL. The actual cost may vary from the figures given, and will depend upon the amount of presswork, paper, binding, etc. Reprints containing half-tones may be expected to cost somewhat more than the rates given.

	2 pp.	4 pp.	8 pp.	16 pp.	COVERS WITH TITLES	
25 copies.....	$2.25	$3.75	$7.75	$9.00	25 copies.....	$1.75
50 "	2.50	4.00	8.25	9.75	50 "	2.00
100 "	2.75	4.25	9.00	10.75	100 "	2.25
250 "	3.75	4.75	10.00	12.00	250 "	2.75

☞ **Our readers will find it to their advantage to carefully consult the advertising pages when desiring to correspond with STRICTLY FIRST-CLASS PARTIES.**

THE AMERICAN

JOURNAL OF PHARMACY

AUGUST, 1920

EDITORIAL.

ENGLISH ORTHOGRAPHY.

Orthography, the topic selected for editorial comment this month, is defined by lexicographers as the art of writing words with the proper letters according to accepted usage: the part of grammar which treats of the nature and properties of the letters and of the art of writing words correctly. It is derived from the Greek *orthos*, right, straight, correct, and *grapho*, I write. In other words, it is *correct spelling*, and to spell "is to write or print words with their proper letters." An orthographist is one who *spells correctly* or in accordance with the rules of grammar. It would be interesting, if it were possible of determination, to learn what percentage of Americans at this time could lay claims to such a designation. Likewise, to ascertain the relative influence of perverted educational methods and of passing literary styles in causing the lamentable lack of knowledge of this part of grammar exhibited by such a large proportion of the present generation.

This subject has received but scant consideration in pharmaceutical literature, possibly because pharmaceutical journalism, very happily, has not, to any appreciable extent, been influenced by the propaganda for spelling reform. The article entitled "The End of Simplified Spelling" from the *Montreal Pharmaceutical Journal*, reprinted in this number of the JOURNAL, is commended for careful perusal. In our correspondence and intercourse with pharmacists we have noted that comparatively few have been carried away by this fad and, moreover, that some of these have rather lately joined in the fag end of the movement.

The medical and chemical journals of America have declined to adopt the more radical changes in spelling that have been advocated. The principal modifications that some of these have adopted have been the substituting of "f" for "ph" in such words as sulphur and in dropping the silent "e" in words ending in "ide," "ine," etc. These modifications are not uniformly carried out in these scientific journals nor are they universally approved of or followed by the members of the scientific and professional organizations representing these vocations. The same may be said of the journals covering the other technical, scientific and professional fields.

The conservative spirit actuating the medical, pharmaceutical and chemical professions and the adherence of the representatives of these to the established rules of spelling was shown by an incident that occurred at the Decennial Pharmacopoeial Convention held in Washington in May. The word "pharmacopoeia" is admittedly a difficult word to spell and has been at times misspelled even in official literature relating to the pharmacopoeial conventions. Yet when a motion was offered to drop the second "o" in the spelling of the word "pharmacopoeia" it was howled down and the preponderance of sentiment against dropping this silent "o" was quite in evidence.

It is doubtful if very many of the followers of these so-called "reforms in spelling" have given any real serious thought to the portent and the influence that the success of the changes advocated might possibly have upon our language or even upon the nation itself.

Roget has stated some of the important functions of language in the following pertinent abstracts:

"The writer, as well as the orator, employs for the accomplishment of his purpose the instrumentality of words; it is in words that he clothes his thought; it is by means of words that he depicts his feelings * * * * Words are the instrumentalities by which we form all our abstractions, by which we fashion and embody our ideas, and by which we are enabled to glide along a series of premises and conclusions with a rapidity so great as to leave in the memory no trace of the successive steps of the process; and we remain unconscious of how much we owe to this potent auxiliary of the reasoning faculty. * * * * *

"It is of the utmost consequence that strict accuracy should regulate our use of language, and that every one should acquire the power and the habit of expressing his thoughts with perspicuity

and correctness. Few, indeed, can appreciate the real extent and importance of that influence which language has always exercised on human affairs, or can be aware how often these are determined by causes much slighter than are apparent to a superficial observer."

The history of the English language is a very interesting study. It has gone through several stages of development and Modern English, the cultivated language forming our Standard English of today, is declared by competent authorities to be so distinctly different from Old English or Anglo Saxon as to constitute these, for all practical ends, two distinct languages as much so as Latin and Spanish. It is a mixed or polyglot tongue exhibiting in its extensive vocabulary the modifying influences of invasion, conquest, wars, explorations, expositions, commerce, advances in the professions, arts, sciences and industries, and the progress of literature throughout the centuries. Intercourse with other nations has added many words from the French, German, Portuguese, Italian, Dutch and other languages.

Nevertheless, the root words have been generally retained intact and the newer words formed therefrom have followed the spelling of their predecessors and the established rules. The forms of pure words have come down to us from the past generations. Of the great body of words constituting the English language the spelling is determined by established usage and the rules of grammar that proclaim such usages are the laws of that science. The spelling of a language is really a process of sifting out and it is the special province of lexicographers to determine the correct spelling in accordance with the principles enunciated in these laws and their conclusions embodied in the accepted dictionaries become the authority or standard of good English, alike for spelling, pronunciation and meaning.

The natural changes that take place in the language are due to many and varied causes whose influences effect gradual innovations recognized by usage and reflected in the dictionaries. Among such may be cited, as examples, labor instead of labour, physic for physick, toils for toyls, choose for chuse, virtue for vertue. Many similar changes have been and are continually going on, almost unperceived, as a part of the process of language evolution and without violating the sense of propriety or infracting the rules of our orthography. We conceive it to be the duty of all English-speaking peoples to preserve the purity of our language.

Reformation is an act of changing from worse to better and not from bad to worse. Such reformation of our language as takes place should be by the orderly processes of *evolution* directed through the proper channels and not by *revolution*. Evolution and not revolution is the line of true progress and staid reform.

We do not assert that there are not some words in the English vocabulary for which simplified spelling would be justified. We are, however, of the opinion that the innovations urged by the enthusiastic propagandists for simplified spelling were entirely too radical and revolutionary and would have upset long established rules and many good authorities. Further, it is our belief that many who joined in this movement had no conception of the basic principles of our orthography and some were purely faddists, while others with insincerity sought a cloak for their own imperfect knowledge and offered as a subterfuge "simplified spelling" that made their already incorrect spelling simply abominable and excused as "phonetic" much that had passed from the state of being funny to the absolutely ridiculous. Whatever claims the movement may have possessed for recognition as a scientific proposition were thus discounted and drowned out by the preponderance of the unscientific exhibitions and it is probable that its actual effect upon English orthography will be quite limited.

By common consent literateurs have been granted privileges with the languages for the purpose of enhancing the art of their profession and, for the sake of rhyme or meter, the poet at times exercises the "poetic license" to modify or to curtail the spelling of a word. This, however, is expected to be done in accordance with literary art and in a constructive manner. At no time, however, has it been conceded that the newspaper or magazine writer, the occasional contributor, the novice or the irresponsible student was privileged *ad libitum* to change the accepted and authorized spelling of English words. Such a procedure would be destructive of the very foundation principles of the language. The ever-widening breaches and the increasing number of words whose spelling was being erratically "simplified" showed the danger to our language from such promiscuous and unauthorized changes.

Editors, as a rule, are not easy prey to false ideas or fads, and it is to their credit that the great majority of American editors have adhered firmly to the authorized and accepted spelling of the dictionaries. Some have adopted the minor and more conservative

modifications proposed, such as "thru," "thoro" and "tho." A few phave not only advocated and used in their publications the simlified and phonetic spelling proposed for common words, but have assumed the authority to add other changes in support of erratic personally made rules.

A rule of grammar that was firmly impressed upon the mind of the writer in his school-days reads "A Regular Verb is one that forms its Past Tense and Perfect Participle by the addition of ed to its present tense." Doubtless, the same rule is still extant in English grammars. In one of our magazines we note the continuous use of such words as "accomplisht," "warpt," "helpt," "suckt," "increast," "rankt," "publisht," "distinguisht," "discust," "focust," "talkt," "decreast," "kilt," etc. Every one of these quoted words are regular verbs and every such deliberate infraction of grammatical rules becomes a mutilation of standard English.

It must be viewed as an unjustifiable assumption that the Editor's knowledge and authority is superior to that of grammarians and lexicographers. It may be construed as a lamentable exhibition of affectation or of self-satisfaction mistaken for editorial service. No one will object to good English or take exception to the use of accepted and authoritative spelling, and it does not appear to the writer as coming within editorial propriety and good taste for an editor to offend continuously by such atrocities a large portion of his readers whose education, love and loyalty thereto, cause them to adhere closely to the standards for purity of our language. It is not the province of an editor to destroy the Nation's language or to take uncalled-for liberties therewith any more than he could with the property of the Nation.

We cannot believe that such pedantry is helpful to the promiscuous class of readers of a magazine. Imagine a reader in South America or in France trying to read the article referred to in which "kilt" appeared; he turns to his English dictionary for the meaning of the word "kilt" and learns that "kilt, is to truss or gather one's clothes in a bunch; a kind of short petticoat worn by men in the Highlands of Scotland" instead of the past tense of kill, as was here intended. Our conception of an editor's duties leads us to believe that he should have a due regard for the feelings of his readers.

The attitude of the Editor referred to is comparable to the anecdote of Nancy who was saying her prayers. "And please God," she petitioned, "make Boston the capital of Vermont."

"Why Nancy," exclaimed her mother, "what made you say that?"

"'Cause I made it that way in my examination."

The AMERICAN JOURNAL OF PHARMACY, under the present editorial management, will adhere closely to the rules of spelling warranted by usage and accepted authorities. Our exceptions to the spelling of the standard dictionaries will be only those which have been adopted in the United States Pharmacopoeia, as, for example, the distinction of alkaloids by the termination "ine" and the retention of "in" as the terminating letters for neutral principles. The Pharmacopoeia has adopted in only a few instances a distinct form of spelling for a limited number of articles for the sole purpose of avoiding error in either distinguishing the article or in its administration. We consider it incumbent upon medical and pharmaceutical journals in the spelling of these words to follow these pharmacopoeial modifications. These are, fortunately, from a philogical view point, only minor changes that do not seriously infract the established rules of English orthography. G. M. B.

DENATURING OF BAY RUM.

In Regulations No. 60, the Bureau of Internal Revenue provided for denaturing of bay rum by the addition of not less than one-fourth grain of tartar emetic to each fluidounce.

Objections have been offered to the use of such a toxic substance as an antimony salt for this purpose and the Department has since issued several memorandums modifying this provision and permitting the use of other denaturing agents. These are not less than five grains of resorcin, or two grains of quinine sulphate, or two grains of cinchonidine sulphate, or five grains of salicylic acid, or five grains of sodium salicylate per fluidounce.

It would appear that these modifications have been proposed largely in the interest of certain manufacturers of hair preparations and toilet articles in which such modifying agents were used in the formulas of the preparations manufactured. These denaturants have not been considered as yielding a product that is satisfactory for the general sale of bay rum in the trade as a toilet water.

A recent decision of Prohibition Commissioner Kramer adds to the list of permissible denaturants for bay rum the addition of the soluble matter of not less than two grains of the pulp of the Colocynth fruit (*Citrullus Colocynthis*) to each fluidounce of the preparation.

In our opinion this will prove a more desirable denaturant for bay rum and other toilet waters and the medication will be sufficient to deter the use of such products as beverages.

THE BIOLOGIC METHODS FOR DIGITALIS ASSAY.*

By Herbert C. Hamilton.

DETROIT, MICH.

There are many steps in the process of transforming the lovely old-fashioned flowering plant, fox-glove, into the powerful medicinal product known as the digitalis heart tonic. In fact, some of the steps might be called stopping places and regarded as of more than passing interest; especially such points as the selection of some one out of the many varieties of digitalis to be the official one, the choice of the portion of the plant to be used, the age of the plant, and the menstruum for extraction. The seriousness of these problems may be judged by the last mentioned, since the U. S. P. Revision Committees have, on each occasion, selected a different menstruum for extracting the crude drug.

But of all the problems demanding attention, probably no one has received more than that of proper means of testing and standardizing the crude drug and its extracts. From the time of Fagge and Stevenson's work[1] recorded in 1866 up to the present time, the controversy has raged unceasingly.

These investigators first used the method later modified and known as the Focke method[2] bywhich the frog was injected in the thigh, the heart exposed and the time noted when the heart stopped in systole.

Koppe, in 1875,[3] studied the action on warm-blooded animals, noting the effect on the heart but especially the amount necessary to induce vomiting. This was later suggested by Hatcher[4] as a means of standardization.

Bennefeld,[5] in 1881, in his careful examination of tinctures of digitalis from different parts of Germany, selected the method later known as the Hatcher Cat Method,[6] the diluted preparation being slowly injected into the vein of a rabbit until death occurred.

Bardet,[7] in 1889, used the frog in the way later suggested by Houghton, that is, comparing activities on the basis of the minimum lethal dose.

Houghton,[8] in 1898, first published the method and described the exact technic by which to standardize the digitalis preparations. The method, at time of publication, had actually been in practice for three years and is the first recorded attempt not merely

*Paper read at the St. Louis meeting of the A. C. S. and published by courtesy of the American Chemical Society.

to test but really to establish uniformity in preparations of this drug.

Prevost,[9] in 1893, used frogs and chose as end-point the systolic stoppage of the heart.

Fraenkel,[10] in 1902, was the first to apply this method, now official in the U. S. P.,[11] as an exact method for quantitative assay, selecting one hour as the time for systolic stoppage.

Focke,[2] in 1902, and frequently at later dates, wrote on the use of frogs for standardizing digitalis. He selected the systolic stoppage in 7 to 10 minutes as the end-point and suggested a formula by which to deduce the value from the data, including the weight of the frog, the dose and the time of systolic stoppage. He has written voluminously on the subject.

From this time on no absolutely new method has been devised, the research being confined to modifications and adaptations of the methods proposed by earlier workers.

Such is the Hatcher Cat Method,[6] the Reed and Vanderkleed Guinea Pig Method,[12] the M. S. D. Frog Heart Method,[11] and the Pittenger Gold Fish Method,[13] although the latter is the only published one using this test object.

Laying aside for the moment the question as to the validity of any of these methods, we should attempt to consider, in a broad way, the more or less derisive question, "Is the sample of drug that has been found to possess the greatest power to kill a cat, the one that will prove most efficient in curing a man?" Rusby[14] is skeptical of such methods because as a botanist he is not fully informed as to their applicability.

Lloyd,[15] perhaps for the same reason, says in reference to a toxicity experiment recorded by Withering: "In those days of heroic medication it was naturally concluded that a drug that could thus kill a turkey must be good medicine to cure a human being, a process of reasoning not yet altogether obsolete."

Beal,[16] with no circumlocution but directly to the point, says: "If we would know the physiologic action of a drug upon the human we must observe its action on the human, this cannot be deduced with any degree of certainty by its action on one of the lower animals."

All these comments are based on a wrong conception of pharmacology. While there are occasional instances where the action of a drug on one animal differs fundamentally from that on another or on a human, such anomalies are usually traceable to fundamental differences in the two species. To illustrate, the cat and dog vomit

easily, the guinea pig not at all. The frog will not respond to the action of a febrifuge since its temperature is always that of the surrounding medium. But all, including man, have the heart and the circulatory system which either directly or through the nerves are acted upon by external influences such as drugs. Certain features of these effects may differ, but fundamentally the fact remains unassailable.

We therefore take issue with Beal to this extent, that while there are unquestionably cases in which the action of a drug on man differs materially from that on certain animals, these are exceptional cases.

Practically every physiological reaction in man has its counterpart in some animal.

It is on this basis that the science of pharmacology is founded. Through the investigation of the action of drugs on animals many of their valuable properties have been discovered; by this means most of these actions have been explained. Digitalis acts as a diuretic. Is it a direct action on the kidneys or is it only an indirect effect of its action on the circulatory system? By animal experiment and not by observation of humans this has been made clear. Digitalis has a strongly tonic action on the heart and vessels. Is its action directly on the muscles or is this an effect of its action on the nerves? Again we are rewarded by the answer as a result of animal experiments.

But the critic is perhaps still dissatisfied. Granted that all this is true he yet is skeptical on one or two points. How is it possible to standardize drugs even if the action on some animal is apparently similar to its action on man? This is a logical question and deserves an answer.

Digitalis administered to animals in doses comparable to the therapeutic dose for man does not show a measurable effect except when such doses are given intravenously to an anesthetized animal, the effect being measured by the aid of a myocardiograph or similar instrument—a measurable effect sufficient for qualitative purposes. For a quantitative test comparison must be made with a standard just as the chemist must have absolutely pure reagents or must be able to discount the impurities by running a blank or some similar procedure.

Digitalis will slow the beat of the heart, increase the amplitude of the beat, raise the blood pressure, but the amount necessary to bring about a definite degree of change in these measurable reactions differs with different dogs, so the effect of the sample on one dog cannot be compared with the effect of the standard on another

dog. By use of a number of dogs an average could be selected, but time and the expense of labor and animals will not permit this procedure. Again, to compare sample and standard on the same animal by means of consecutive injections is not practicable because the elimination of digitalis is so slow that the animal never fully returns to its original condition to permit comparing two injections even of the same sample.

For these reasons, attempts to use this as the end-point have been abandoned and the death of the animal or in the case of frogs, stoppage of the heart in systole selected.

Not only, therefore, can the action of drugs on the human be deduced from that on the lower animals, but also the degree of the action can be measured and the exact manner of action explained.

Lloyd's statement in reference to killing a turkey and curing a man may have been true in those days when the science was undeveloped. At present, however, the fact of killing is of little importance; the vital points in the experiment are the amount that killed, the action of smaller doses and the possibility of applying the substance clinically to relieve a pathological condition.

There is no known medicinal substance which, taken in excessive quantities, does not induce toxic symptoms and in most cases, death. It is not valuable because of this but in spite of it.

The question raised by Rusby is entirely logical and *apropos*. If a substance is standardized solely on the basis of its M. L. D. with no regard to the characteristic effect which that substance may be expected to produce, common sense suggests that such a test is inadequate and should be used only if no verifying effect is available. We will attempt to apply this test of adaptability to the various methods for the assay of the digitalis series, disregarding the question of accuracy and keep in mind only whether the test shows digitalis glucosides and no other poison to be present.

The Gold Fish Method, while little known or practiced, is a proposed means of assaying digitalis by its toxic action on gold fish, the drug being mixed in various dilutions with the water in which they swim. The end-point is the dilution which kills after a certain period of contact and with due regard to certain factors, such as the temperature of the medium. It has the advantage of being one of the simplest and probably cheapest of all. But for the fact that there is nothing typical of digitalis in the action of the drug on the test animal there is no reason why it should not have a

favorable consideration. The gold fish, however, is exceedingly sensitive to substances not always recognized as poisons and certainly not in the same class with digitalis. While the chances of a foreign and more toxic substance being found with digitalis are remote, they are always possibly present as every manufacturer knows. Without a confirmatory test, the gold fish M. L. D. method is to be classed as questionable.

The guinea pig method is no less open to question on the same score, although the results obtainable purely on toxicity are quite uniform and accurate. In this instance, also, there is no observable reaction characteristic of digitalis either before or after death; and death often results from respiratory paralysis rather than a direct action of digitalis on the heart.

The method is simple and as described by the authors inexpensive, since the intention is to use guinea pigs already used for another purpose for which they no longer are eligible, and therefore with a value theoretically nil.

Injection is made subcutaneously and results recorded after a definite period. Results show that pigs, while fairly uniform, have individual variations as well as seasonal, but these can be eliminated as factors in the assay, by the occasional test of the standard and by the use of a number of pigs to obtain the average M. L. D.

The Hatcher Cat Method seems to have even less to recommend it since there is nothing characteristic of digitalis in the death of the animal and further its inaccuracies have been the subject of comment by several authors. Hatcher[6] noted that in some cases, cats required a dose of 50 per cent larger than the average M. L. D. Robinson and Wilson[17] found in a series of ten cats that the M. L. D. ranged from 70 to 210 per cent. of the average M. L. D. Eckler[18] found a variation of over 100 per cent. in the M. L. D. of cats.

The details first published by Hatcher for the assay of digitalis required that the immediate cause of death should be ouabain, only a part of the M. L. D. was to be brought about by the digitalis. The cat is partly anesthetized in order to open a vein into which is inserted a glass canula. Through this the injection is made slowly over a stated period. The animal must die in less than 90 minutes. The method has been modified by most investigators, especially by those who found any valuable feature in it.

The only radical change, however, is that made use of by Newcomb of the Pharmacy Department of the University of Minnesota.

It is commonly assumed that Newcomb uses the Hatcher Method without material change from that first published, and this opinion will perhaps prevail until some published account of his work appears. Unofficially, however, certain statements have been made such as these: "Hatcher's method, without modification, is of little value." "The cat is the least important part of the method." "The important part of the method is the observation of the action of digitalis on the bundle of His."

One may assume, therefore, that Newcomb discredits Hatcher's Method in which the death of the cat is the deciding factor and pins his faith on observing the heart block which follows fatigue of the auriculo-ventricular bundle. This is, to a limited extent, characteristic of digitalis poisoning and so may be regarded as a valuable feature to distinguish the *character* of the poisoning, but it adds nothing to the accuracy of the only quantitative features which the test possesses, namely, the M. L. D. (minimum lethal dose).

As a qualitative test this feature is admirable; but no pharmacologist has succeeded in making the test an accurate quantitative one unless as yet unpublished.

The M. S. D. Frog-heart Method—the Pharmacopoeial method—is, in brief, to inject the diluted preparation into the abdominal lymph sac of the frog, injecting them in series of three and at the end of one hour exposing the heart to observe its condition. The end-point is, that at the end of the one-hour period, the heart must be stopped in systole while the next smaller dose—a difference not to exceed 10 per cent.—leaves the heart beating at that time. This method has two advantages over those employing mammals, namely, that a sufficient number of test animals can be used to detect and exclude those more or less resistant than the average and to test the standard on a number of similar animals under exactly the same conditions of weight, age, temperature and season, all of which may be variants. It has the further advantage that the end-point can be recognized as being due to one of the digitalis series and to no other poison by the position of the heart in systole.

It has the advantage over Newcomb's modification of Hatcher's method in the greater accuracy in the end-point by having a large number of test animals from which to exclude those of exceptional resistance—either high or low.

The M. L. D.[19] Frog-heart Method has for its end-point the minimum lethal dose—the smallest dose causing death with heart in systole.

The frogs are injected in the abdominal lymph sac with dilutions of the preparation, using such dilutions as to make a total dose less than 1 Cc. The frogs consistently dying with this dose are examined to observe the position of the heart which must be in systole, the same as by the one-hour method.

This has all the merits of the U. S. P. Method with the added advantage that in case of slow absorption the longer time limit permits, in most cases, total absorption. A further advantage lies in the fact that the frogs are not handled roughly, as in pithing and laying bare the heart, a procedure which may tend to influence the results adversely.

A third advantage is in the certainty of the end-point—death—as against the frequent occurrence of a heart at the end of the one-hour period not being positively stopped in systole.

Dr. Edmunds, of the Department of Pharmacology of the University of Michigan, and Dr. Worth Hale, Assistant Dean of the College of Medicine of Harvard University, were called to Washington to carry out such experiments as would determine, if possible, which of the methods is most practicable and reliable for the assay of digitalis. Their results and conclusions appear in *Hygienic Laboratory Bulletin No. 48.*[20]

Regarding Focke's Method, which is used mostly in Germany, they say: "However even with these precautions we believe that this method allows of greater variations and inaccuracies than any other method we employed."

Attempts to apply a test by which the increase in blood pressure is used as the measurable reaction led to the following conclusion: "The blood pressure method upon cats and dogs commends itself on account of the close relation it sustains to the use of the drug in clinical practice. The objections consist in the difficulty of procuring these animals at times, and also the necessity of carrying out repeated tests to confirm the results which a study of our tables show will vary greatly."

As regards the M. L. D. and M. S. D. Frog Heart Methods, they found it impossible to choose with any degree of accuracy. "Between these two methods as far as can be judged in the light of our present knowledge it is largely a question of personal preference or convenience."

Cushny[21] ("Pharmacology and Therapeutics") comparing the action of digitalis on frogs and mammals, says: "The effects

of digitalis on mammalian heart therefore resemble in general those observed in the frog's. The contraction is not prolonged, however, as in the latter and the inhibitory mechanism plays a more important rôle. . . . The heart in mammals is generally found in a condition of diastole in cases of fatal poisoning and this has been supposed to indicate a fundamental difference in the action of digitalis on the amphibian and the mammalian heart. The dilatation is not, however, a direct result of the digitalis but is probably induced by the poisons formed in the heart by its own activity."

It is evident, therefore, that the frog shows a typical effect of digitalis just as distinctly as the mammal, that it can be used in numbers economically impossible in comparison with cats or dogs and thus overcome the factor of individual variations that the digitalis action differs in no material respect from that on mammals.

The very fact that the science of Pharmacology has made such wondrous strides is evidence that the action of drugs on the human may be deduced from that on the lower animals.

The very fact that a system of dosage has been worked out for the powerful drugs shows that their action is measurable by the effects produced.

Few, however, seriously claim to be able to deduce human dosage of a new drug from its effects on experimental animals, except in the most superficial way, and with our present knowledge any such attempt will probably lead to failure.

It is, on the other hand, common laboratory experience to obtain practical working information in regard to a new drug by comparing the intensity of its effects with that of a similar known drug. If, for example, a special preparation of digitalis such as an active principle is produced, its good and bad properties can readily be deduced for human medication by comparing it with Tr. Digitalis on laboratory animals.

Or an entirely new local anesthetic can be compared with cocaine on animals and thus obtain actual data as to its effectiveness under most conditions and its comparative toxicity, absorbability and rate of elimination.

Pharmacology is the study of the action of drugs on the lower animals by which much can be learned as to the adaptability of drugs in therapy and their mode of action, their advantages and disadvantages in comparison with others of similar character.

Pharmacological assaying is the application of this information

so that powerful drugs can be standardized although possessing no chemical reactions by which their values can be determined.

The scope of each is distinctly defined, the assay process being subordinate to and based entirely on the pharmacology of the drug in question.

The criticisms of the biologic assay process in general are really without material basis since it is strictly analogous to the chemical assay. Neither assay method attempts to encroach on the clinical application of a drug but concerns itself only with the potency. Both make use of the reaction which most accurately determines the amount of active agent present by use in the one case of chemical reagents, in the other of the animal least subject to variations.

Digitalis, therefore, as one of the most valuable drugs at the command of the physician, cannot be permitted to pass without standardization.

The selection of the method should be based on the most typical effect which is measurable and which is subject to the least variation that is beyond the control of the operator.

BIBLIOGRAPHY.

[1] Fagge and Stevenson: Reprint from Guy's Hospital Reports (1866).

[2] Focke: *Therap. d. Gegenwart*, 44: 45, 1903; *Archiv de Pharmacie*, 241: 128, 669, 1903.

[3] Koppe: *Archiv exp. Path u. Pharm.*, 3: 274, 1875.

[4] Hatcher, R. A.: *J.Am. Med. Assoc.*, 48: 1177, 1907.

[5] Bennefeld: Inaug. Dis. Goettingen, 1881.

[6] Hatcher, R. A.: *Am. Jour. Pharm.*, 82: 360, 1910.

[7] Bardet: *Bull. Soc. de Therap.*, 16: 253, 1889.

[8] Houghton, E. M.: *Jour. Am. Med. Assoc.*, 31: 959, 1898.

[9] Prevost: *Rev. Med. de la Suisse Rom.*, 13: 505, 1893.

[10] Fraenkel: *Therap. d. Gegenwart*, 43: 106, 1902.

[11] U. S. Pharmacopoeia, IX.

[12] Reed and Vanderkleed: *Am. J. Pharm.*, 80: 110, 1908.

[13] Pittenger, Paul S.: *Jour. Am. Pharm. Assoc.*, 4: 427, 1915.

[14] Rusby: *Druggists' Circular*, Sept., 1916.

[15] Lloyd: House Circular on Digitalis.

[16] Beal: Address before Convention of Eclectic Physicians, 1919.

[17] Robinson and Wilson: *J. Pharm. and Exp. Therap.*, 10: 491, 1918.

[18] Eckler, C. R.: *Am. Jour. Pharm.*, 83: 491, 1911.

[19] Houghton, E. M.: *American Druggist*, 1911 and 1912.

[20] *Hygienic Laboratory Bulletin 48.*

[21] Cushny, A. R.: "Pharmacology and Therapeutics."

RESEARCH LABORATORY,
PARKE, DAVIS & COMPANY,
DETROIT, MICH.

STUDIES ON COMMERCIAL VARIETIES OF NUX VOMICA.

By H. W. Youngken, Ph.D., and C. F. Slotter, B.Sc.

PHILADELPHIA, PA.

It is thought that Nux Vomica was introduced into medicine by the Arabians, but the records in their writings which have been supposed to refer to it are far from clear and satisfactory. Neither is there evidence that the drug was used in India. But it was certainly made known in Germany during the sixteenth century, for Valerius Cordus[1] wrote a remarkably accurate description of Nux Vomica about the year 1540. However, it was not until 1770 that it came into use as an article of medicinal value. That value has since increased, owing to the discoveries of Pelletier and Caventou, who isolated the alkaloids, strychnine and brucine, first in *Strychnos Ignatii* and later in *S. Nux-Vomica*, until to-day we find the drug an article of considerable importance.

The seeds are yielded by *Strychnos Nux-Vomica* (fam. *Loganiaceae*), a small tree growing wild in the forest of India, from the eastern seaboard far into the interior, and also in the forests of Ceylon, Burmah, Siam, Cochin China and northern Australia. According to Zörnig[2] and Flückiger[3] they are collected and dried and sent into the market through Bombay, Cochin, Madras, and Calcutta, and thence to London. However, Calcutta is merely a collecting and grading center and does not furnish any distinctive variety of Nux Vomica, since there are no trees of that kind anywhere near Calcutta.

The problem, then, confronting us was to determine some means of distinguishing between the present true varieties of the drug. Consequently the Tellicherry, Madras, Cochin, and Ceylon varieties were examined as to the macroscopic and microscopic characteristics. Owing to the small amount of authentic material obtainable for consideration, it is our purpose to present at some later date a continuation of these studies.

The macroscopic examination included a consideration of the following physical characteristics: outline and shape, prominence of the ridge, hilum and micropyle, color and appearance, thickness, diameter and specific gravity. The specific gravity was determined by selecting two representative seeds for each variety, noting their weight in air and loss of weight in water.

CEYLON NUX VOMICA.

This variety is orbicular and in many cases decidedly concavo-convex. The hilum is prominent and often *raised* (wart-like) with one or two concentric elevations between it and the margin; the ridge is distinct and micropyle prominent. It is either silver-yellow or silver-green in color and vividly glossy, presenting a satin-like appearance; 4 to 7 mm. thick and 15 to 25 mm. in diameter. The specific gravity determined was 1.2102.

TELLICHERRY NUX VOMICA.

This is orbicular and nearly flat, with the hilum, ridge, and micropyle all rather indistinct and the margin usually acute. It is silver-yellow in color but not as glossy as the Ceylon variety; 3 to 5 mm. thick and 20 to 25 mm. in diameter. Its specific gravity as determined was 1.3521.

MADRAS NUX VOMICA.

The Madras is nearly flat, orbicular, and shows a hilum not as pronounced as Ceylon, but with the ridge and micropyle prominent. Its margin is usually rounded, the color a dull ash-green, thickness 3 to 5 mm., diameter 15 to 20 mm., and the specific gravity 1.3024.

COCHIN NUX VOMICA.

Samples from four different sources were examined. They possessed the usual orbicular form, were slightly concave, showed an indistinct ridge, a rather prominent hilum and micropyle and usually a rounded margin. The color was uniformly of a dull silver-gray except in the case of an unwashed sample which was a dull dirty-gray having adhering brownish black patches. The seeds ranged from 4 to 5 mm. in thickness, from 15 to 30 mm. in diameter and gave specific gravities as follows:

(1)	1.2433
(2)	1.3236
(3)	1.2857
(4)	1.3334

For microscopic study, transverse sections were made through the center of the seeds and mounted in chlor-zinc-iodine. They were compared as to the measurements of the outer layer of endosperm cells, the thickness of their walls, length of hairs and the appearance when viewed under polarized light.

Entire hairs ranged in length from 770 to 1300μ in the case of Ceylon Nux Vomica, 630 to 980μ in the Tellicherry, 630 to 700μ in the Madras, and 630 to 980μ in the Cochin variety. The longest hairs were noted on the Ceylon Nux Vomica, but the other observances demonstrated little in the way of diagnostic differences. When viewed under polarized light the hairs of all varieties presented the same striking appearance. Measurements determined for the outer endosperm cells averaged as follows:

Ceylon	20 to 31μ × 12 to 15μ
Tellicherry	38 to 42μ × 9μ
Madras	28 to 31μ × 9 to 12μ
Cochin	28μ × 9μ

These cells appeared more regularly rectangular in the Tellicherry than in the other varieties.

BIBLIOGRAPHY.

1. "Hist. Stirpium," edited by C. Gesner, Argentorat. 1561. lib. iv. c. 21.
2. "Arzneidrogen," Zörnig, Vol. 1, Page 630.
3. "Pharmakognosie des Pflanzenreiches," Flückiger, page 958.
4. "Pharmacographia," Hanbury and Flückiger, page 428.

MAKING USE OF NATIONAL AND STATE BULLETINS UPON SCIENTIFIC SUBJECTS.*

By Charles H. LaWall, Ph.M.

"Know your opportunity," said Pittacus, one of the seven wise men of ancient Greece.

One of the usually unrecognized opportunities of acquiring information and of accumulating a valuable collection of reference pamphlets is that afforded by the publications of the Scientific Bureaus of both State and Nation.

Many of the inquiries which come to the pharmacist from his patrons are upon subjects which are not directly related to his profession, at least not so closely as to be found in any of the textbooks or works of reference that may be upon his bookshelf, and yet closely enough to make him the one logical person in a community to whom such inquiries should be addressed.

* Read before the meeting of the Pennsylvania Pharmaceutical Association, Harrisburg, June, 1920.

A person who sits on a freshly painted park bench, or who spills gravy somewhere between his Tropic of Capricorn and his Equator, usually rushes frantically to the nearest pharmacist for assistance and relief. How to remove mildew, fruit stains or spots of unknown origin are frequent subjects of inquiry, and it is a wise adviser who will first fortify his knowledge by consulting some authority upon the subject, rather than risk giving off hand and incorrect advice which may result in the ruining of the fabric and the adviser's reputation simultaneously.

It is not generally known to pharmacists, I believe, that a valuable government publication is available, giving information upon these important matters.

It is entitled "Removal of Stains from Clothing and other Textiles," by Harold L. Lang and Anna H. Whittelsey, and is known as Farmers Bulletin No. 861, of the United States Department of Agriculture. This bulletin of thirty-five pages, contained trustworthy information based upon scientific knowledge, for the removal of more than fifty different kinds of stains and spots, and contains complete details for the intelligent use of such solvents, reagents and bleaches as are referred to as being of value. It also contains a complete index. This, unless the supply is exhausted, and any other of the U. S. Government publications, may be obtained upon application to the "Superintendent of Documents, Washington, D. C." For some a nominal fee of five or ten cents is charged, but for many publications, especially those called "Farmers Bulletins," no fee whatever is charged. In writing for government publications much time may be saved by enclosing a small sum in probable excess of the cost of the bulletin if the cost is not known. Enclosures must not be made of postage stamps in payment of fees for government publications, for the government departments, all having the franking privilege, have no use for stamps and are not permitted to take them, so actual currency must be sent.

Another very valuable publication which will be frequently used by those who possess it, is a publication of the Department of Commerce entitled "Circular of the Bureau of Standards No. 55, Measurements for the Household." This is an elaborate book of nearly one hundred and fifty pages on calendered paper, profusely illustrated and well indexed. It is concerned with the dissemination of information as to units, methods and instruments of measurements useful in household activities, with many associated facts of interest and value.

In this publication are described the use of scales, measures of volume, measures of length, instruments for measuring heat, light, electricity, gas, water, atmospheric humidity, atmospheric pressure, density of liquids and time.

Much scientific information of general value is interestingly given and this publication is worth many times the price of fifty cents, which is charged for it.

"Say it with flowers" has been paraphrased to "Say it with poison ivy" in case one wishes to put reverse English upon his compliments. How to recognize poison ivy and twenty-nine other poisonous plants of indigenous growth is made possible by the possession of *Farmers' Bulletin 86* of the United States Department of Agriculture, entitled "Thirty Poisonous Plants of the United States," by V. K. Chesnut. This bulletin contains an illustration of each of the plants, a description of it and the locality where it is likely to be found, together with a description of the symptoms of the poisonous effects produced.

If one is interested in being posted on house flies, and in learning how to get rid of them, if they neglect to wipe their feet before walking over the food, there are several government bulletins that will afford the opportunity. One of these is Farmers Bulletin 459 on "House Flies," by L. O. Howard, which is an amplification of *Circular 71* of the Bureau of Entomology upon the same subject. It will surprise many readers of this bulletin to learn that the familiar house centipede or "thousand-legger," as it is usually called, is one of the natural enemies of the house fly and destroys large numbers of them.

The cockroach and the bedbug have their family history revealed and all of the intimate details of their lives exposed in *Circulars 51* and *47*, respectively, of the U. S. Department of Agriculture, Division of Entomology. Both of these pamphlets are by C. L. Marlatt, who seems to be better acquainted with these than most of us would care to be, judging from the thoroughness with which he discusses them. According to Mr. Marlatt, cockroaches are among the natural enemies of bedbugs and rapidly exterminate them when given an opportunity, but as the means of bringing them together is not suggested the statement loses some of its value. Perhaps the remedy would be to sleep in the kitchen and take one's meals in the bedroom in a house that happened to be doubly infested.

A very important publication dealing indirectly with the same subject is "*Circular 46* of the Bureau of Entomology, U. S. Department of Agriculture, on Hydrocyanic Acid Gas against Household Insects," by L. O. Howard.

This method of fumigation has upon numerous occasions been the cause of death of those who attempted to carry out the operation without realizing its dangers. Inasmuch as the pharmacist is the one who is usually called upon to supply the materials to be used for this method of fumigation, it is reasonable to expect of him that he should have authoritative knowledge upon the subject and be prepared to give advice as to the details of carrying out the process with a minimum of danger.

Farmers' Bulletin 127 deals with "Important Insecticides" in general and is by C. L. Marlatt. In it are discussed at length the methods of preparing and using all of the commonly used insecticide sprays, washes, vapors, soaps and oils. The usefulness of this bulletin will be more apparent to the country pharmacist than to his city brother, for it is in the country that Bordeaux mixture, lime-sulphur spray and kerosene emulsion are more frequently called for.

The foregoing are just a few scattered examples taken from the writer's collection of similar publications which has been accumulating for years and which has been found to be of great and continual value. To those who contemplate starting a collection of this kind it may be suggested that upon application to the Superintendent of Documents, there will be sent free of charge a complete index of government publications with prices thereof. To those who, having established such a collection, wish to keep it up to date, a monthly index will be sent containing lists of new bulletins, circulars, etc., as issued.

This is one of the neglected or unrecognized opportunities which, when properly taken advantage of, will yield returns both in money and in prestige to the pharmacist who takes the time and trouble to make such a collection and use it.

NOTES ON HENNA.

By Benjamin H. Hoffstein, Ph.C.

Despite the fact that Henna has been in use for some thousand years, the literature dealing with its various compounds and uses is scattered and fragmentary. The various compounds of Henna have

indeed been neglected, this prompted the research in literature, analysis and experimentation contained in this paper.

The word "Henna," which means "to become queen" is indicative of something highly elegant.

The drug known as "Henna" is derived from the plant *Lawsonia inermis*, Fam. *Lythraceae*. Some botanists recognize but one species, the *L. alba* with two varieties, *L. inermis* and *L. spinosa;* others indicate the fact that the young Henna plants are devoid of spines while the older plants have branchlets which have hardened into spines and so belong to the same variety of *Lawsonia*. *Ligusturum Egypticum* is a latinized English synonym for Henna, arising from the common name for the same in England, that of Egyptian Privet. This synonym is quite erroneous since it places the *L. inermis* in the group of Privets to which it does not belong.

Henna assumes quite a variety of names according to the country in which this plant grows. In Persia, it is known as "Henna," in Egypt the plant is called "Khenna," in Arabia it is known as "Alkhenna," in India it is called "Mendeed" and in the West Indies where the plant has been naturalized, it is known as "Jamaica Mignonette."

L. inermis is of a slender shrubby nature, from about eight to eleven feet in height, bearing smooth, opposite, lance-shaped leaves, with entire margins. The flowers are small and white, with four petals and are devoid of panicles. They possess a very pleasing odor. The drug on the market consists of the leaves and twigs of *L. inermis* and is of ancient repute as a cosmetic and active medicinal agent in the countries to which it is indigenous.

The primordial use of Henna appears to have been more a matter of hygiene than that of augmenting beauty. The aqueous infusion of the leaves applied to the external surfaces of the body was used as a prophylactic against certain skin diseases which are quite prevalent in the eastern tropical and semi-tropical countries. Another property of this infusion was said to be that of producing a cooling sensation to the part applied, acting gently on the sweat-glands, reducing their activity, benefiting both health and comfort. The root of the henna plant was upheld as a specific in leprosy and also in drying up certain ulcers of the mouth and gums. The flowers of the plant are still used in preparing a delicate highly esteemed perfume of the East said to be equal in aroma to our lilac. The fruit is claimed to be an emmenagogue.

The most common use of Henna among the ancients was that of a dye. Among the Mohammedans, both men and women used it and those that did not employ it were considered indecent. In China the infusion is used to paint an orange red line underneath the eyebrows, and so considered as an aid to beauty. In most of the Mohammedan countries, the hair, soles of the feet, palms of the hands and finger-nails were stained an orange red color by an aqueous infusion of this drug. That this practice had been carried on in the remote ages is shown by the color of the various parts of the bodies of the old Egyptian mummies. Henna was also used to color the manes and tails of horses.

The Ancients made an aqueous infusion of the powdered leaves and twigs of henna and dyed the hair a light auburn color. The darker gradations of this color were brought about by the use of infusions of catechu or lucerne (Alfalfa) leaves. Vinegar and alum water were used in combination to produce darker auburn shades, at the same time acting as mordants. However, the color of Henna without the use of mordants lasted three or four weeks despite the frequent use of baths.

The coloring value was taken advantage of in staining various skins and soft leathers an orange red color as well as in staining certain woods of light shades a mahogany color. The use of Henna in dying wool and silk has also been reported favorable and staple shades have been produced with various mordants.

For the dying of hair the market at present offers two varieties of powdered Henna, namely, an Egyptian and Arabian variety. The Arabian is more esteemed but before it comes into the market it is adulterated with sand to make it of equal coloring virtue to the Egyptian. In Turkey the powdered leaves of *Anchusa tinctoria* are said to be substituted for Henna.

Returning to our present day we find that the use of Henna as a recoloring for hair is still being used by a number of people, producing the Titian and Henna shades, by the following procedure:

About 200 Gms. of drug is used for one application. This is divided into two portions. With portion No. 1 an aqueous infusion is made, using one pint of boiling water. This infusion must be used while still hot and applied with a brush. With portion No. 2 make a moderate thick paste using water. Apply to the hair and hold in place with a towel wrapped around the head. Allow to remain for thirty minutes. Then rinse the hair in tepid water, a recoloring being necessary within about thirty days.

There are, however, on the market at the present time a large number of so-called Henna Hair Dyes and Henna Hair Compounds producing as many as eleven different shades. Henna alone produces only a few shades in Auburn according to the concentration of the infusions. The many shades and colors produced by the numerous hair compounds mainly rely upon the leaves of *Indigofera tinctoria* known as "reng" for the production of dark colors, and the admixture of metallic salts with plant tannins to form inks. Among the common metallic salts used are $SnCl_2$, $NiCl_2$, $FeSO_4$, $CuSO_4$.

In a recent analysis a guaranteed Henna hair compound, considered to be one of the best on the market disclosed the following combination: Powdered Sumach, Henna, $FeSO_4$, $CuSO_4$. These ingredients were placed in the container in layers. The Sumach admixed with small quantity of Henna made up the lower layer. The metallic salts in a powdered form were admixed with 50 per cent. of Powdered Henna making up the second layer and the top layer consisted of Powdered Henna leaves. The directions indicated the use of the entire contents of the container at one application. These ingredients made up ten shades of dye being admixed in different proportions. The blond color of this dye was suspected to contain a mixture of Henna and Picric Acid, the latter being present to the extent of one-half per cent. The coloring in this set of hair dye was dependent upon the tannin found in Sumach and Henna which produced inks with the metallic salts of copper and iron; at the same time these metallic salts acted as mordants to the dye principle present in Henna.

Another analysis of a different set of dye contained a mixture of Pyrogallol and Henna in one container and a mixture of Ammonium Chloride and Copper Sulphate in another. The Henna in this case made up about 2 per cent. of the mixture.

The Encyclopedia Britannica, 11 Edition, 1910–11 and Lindslay state that Henna contains no tannin and it appears that numerous other works have copied and recopied this statement which is erroneous.

According to the method of Herraony in the AMERICAN JOURNAL OF PHARMACY, Volume 35, page 177, a tannin can be extracted from Henna and this has been used to dye hair, being very efficient, acting in a shorter space of time than powdered Henna.

The method consists of extracting the chlorophyll of Henna with ether, then percolating the residue with 90 per cent. Alcohol, dis-

tilling off the Alcohol and again exhausting the syrupy residue with ether. The residue is dissolved in 95 per cent. alcohol which is again distilled off. This method yields a resinoid tannin soluble in hot water and capable of reacting with ferric salts and gelatin like other tannins. The originator of this method named the dye principle in Henna, Henna-tannic Acid.

BOTANICAL RESEARCH LABORATORY,
PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE.

SUGGESTIONS FOR UNITED STATES PHARMACOPOEIAL REVISION SUBMITTED BY THE COMMITTEE ON THE UNITED STATES PHARMACOPOEIA OF THE PHILADELPHIA COLLEGE OF PHARMACY.

MAY, 1920.

SCOPE AND GENERAL PRINCIPLES.

Scope of the Pharmacopoeia.—We recommend that the limitations applied against the admission of patented and proprietary preparations and medicinal substances in the U. S. P. IX, be continued in the next revision.

The Diagnostical Reagents and Clinical Tests.—We consider this as extra pharmacopoeial, not being within the scope of a book of standards for medicines, and the scope as defined in the U. S. P. IX, and therefore should be eliminated from the book.

Posology.—We recommend that there be established a special sub-committee on Posology of the Committee on Revision; further, that in place of the statement of average doses, as shown in the U. S. P. IX, there be given *a range of commonly prescribed doses for adults*, and that this be accompanied by a statement that the doses given are to be considered as advisory for the guidance of the physician, not as compulsory, or restricted doses.

In the interest of uniformity and accuracy, a standard dosage measure should be described by the U. S. P.

Pharmacopoeia Titles for Synthetic Chemicals.—We recommend that the Committee of Revision be given authority to coin short and euphonious names for synthetic chemicals, where the chemical name is too lengthy or unwieldy for a title, but that in all such cases the true chemical name be given as a synonym.

Synonyms.—Where several names are in extensive use in the drug trade, these should be given as official synonyms.

Limitations of Purity.—We recommend that the statement in the present revision, under the head "Purity and Strength of Pharmacopoeial Articles," be amended by eliminating the last clause relating to the standards of drugs in other countries.

International Standards.—While approving of the principle of International Standards for potent drugs and medicinal preparations, it is believed that the standards of the Brussels Conference of 1902 should receive careful revision, and that another International Conference should be convened for determining proper International Standards at this time.

List of Official Preparations.—We recommend that a statement of the preparations, in which the article is used, should be continued in the monographs, as in the last revision (U. S. P. IX).

Alcoholic Percentages.—We renew the recommendation that there should be added to each official liquid preparation containing alcohol a statement of the range of alcohol, by volume, contained in the product.

Assay Processes.—We urge the re-adoption, and putting into effect, of the recommendations that tests of identity and purity be given for determining the character of the products of Assays.

Biologic Assays.—These should be called Pharmacodynamic Tests, and should be admitted only where the standardizing of the drugs or preparations cannot be satisfactorily determined by chemical assays, and where the proposed methods for pharmacodynamic testing are sufficiently developed to yield concordant results.

Serums and Bacterins.—We recommend that the list of admissions of this class of Biologic Products be extended only where standards have been established by the proper governmental department.

Weights and Measures.—We recommend that the Metric System of Weights and Measures only should be used throughout the entire book.

Supplements.—The Executive Committee should again be empowered to issue supplements to the Pharmacopoeia, if, in their judgment, such be necessary.

Publicity.—We recommend that the Chairman of the Committee of Revision, with the approval of the Executive Committee, issue preliminary statements of the progress of the revision, and of the important changes contemplated.

Atomic Weights.—We recommend that the Atomic and Molecular Weights be based upon the latest available list of Atomic Weights, authorized by the International Committee on Atomic Weights.

General Formulae.—The introduction of General Formulae into the U. S. P. IX we believe has been entirely satisfactory, so far as applied. We recommend that the use of General Formulae be extended to every class of preparation where such a general treatment is possible.

Physical Constants.—We recommend that official methods for determining Physical Constants be given in the U. S. P. X, and the methods described in the U. S. P. IX should be extended and improved.

Solubilities.—It is recommended that the statements regarding Solubilities be extended to cover all of the more commonly used solvents.

Standard Temperature.—We recommend that the U. S. P. retain in the next revision 25° C. as the standard temperature, except in the case of alcohol.

Compound Preparations.—The introduction of formulas for new "Compound Preparations" should be discouraged.

Pharmacognostical Descriptions.—It is recommended by your Committee that the description of Crude Drugs, with brief pharmacognostical descriptions, both macroscopic and microscopic, as given in the many monographs of the U. S. P. IX, be extended to cover all drugs where the knowledge will permit of such pharmacognostical descriptions.

Powdered and Ground Drugs.—Wherever practicable, the ground or powdered drug should be required to represent the entire drug. Where the data available is sufficient to serve as a basis for a standard for allowable tailings, gruffs or residue, this should be determined and inserted in the text.

Date When Official.—It is recommended that the Committee of Revision continue the practice of printing upon the Title Page of the Pharmacopoeia a definite date when the revised Pharmacopoeia shall supersede the previous edition. Due consideration should be given to the time necessary to dispose of stocks on hand and to prepare new formulas for the trade. The period between the time when the book becomes available to the trade and when it becomes official shall be not less than six months.

ADMISSIONS AND DELETIONS.

Additions Recommended.	*Deletions Recommended.*
Acetyl-Salicylic Acid	Aluminum Hydroxide
Arsphenamine	Ammoniated Glycyrrhizin
Barbital	Bismuth and Ammonium Citrate
Barbital Sodium	Ceylon Cinnamon
Barium Sulphate (Purified for X-Ray use)	Chondrus
	Cottonseed Oil
Benzyl Alcohol	Effervescent Citrated Caffeine
Benzyl Benzoate	Emulsion of Almond
Carrell-Dakin Solution	Ethyl Carbamate
Chloramine-T	Fluidextract of Staphisagria
Chlorcosane	Glycerite of Hydrastis
Chloretone	Lithium Carbonate
Di-Chloramine-T	Morphine (Alkaloid)
Neoarsphenamine	Saccharated Ferrous Carbonate
Peanut Oil	Serum Antidiphthericum
Picrotoxin	Serum Antitetanicum (The purified form has, in practice, entirely superseded the last two)
Physostigmine Sulphate	
Procaine (Novocaine)	
Scarlet Red	Sesame Oil
Silver Albuminate	Solution of Sodium Glycerophosphate
Silver Nucleinate	Sweet Almond
Solution of Benzyl Benzoate (20 per cent.)	Tincture of Lactucarium (If the Syrup is prepared from the drug)
Tincture of Staphisagria	Uranium Nitrate

CHEMISTRY.

Definitions and Derivations.—It has been the custom of the U. S. P. to state the derivation of organic chemicals and to give some sort of a definition for this class of substances. Tartaric acid is described as "A dibasic organic acid, usually obtained from wine lees or argol." Quinine sulphate is defined as "The sulphate of the alkaloid quinine." Such statements and definitions might have been useful in the earlier revisions, but they are no longer needed. With the present official status of the U. S. P. statements of this kind, if strictly interpreted, may cause misunderstandings. Glycerin, for instance, is defined as "A liquid obtained by the hydrolysis of vegetable or animal fats, or fixed oils, purified by distillation." Would glycerin made by fermentation of sugar or from hydrocarbons (several patents claim the latter process) and purified by other means than distillation not be suitable for pharmaceutical use if it meets all purity requirements? The same applies to citric and tartaric acids, the latter of which may eventually be made from benzine, and to a number of other official organic chemicals.

It is quite safe to say that the average user of the Pharmacopoeia knows better what the sources of quinine or sugar are then those of acetic acid or ammonium chloride. The U. S. P. does not give the derivation of the latter two substances, yet apparently nobody missed it and it did not detract from the prestige and value of the book. For the purpose of the Pharmacopoeia, the derivation of a *definite* chemical substance, like the method of its manufacture, does not at all matter, provided, of course, it measures up to the U. S. P. specifications.

The definition of quinine sulphate as "The sulphate of the alkaloid quinine," and similar other definitions are tautologies. Sodium sulphate is not defined in the U. S. P. as the sulphate of the metal sodium. Why?

It is therefore recommended that in the next revision of the Pharmacopoeia derivations of *definite* chemical compounds and definitions of organic chemicals, of the character cited above, be omitted except when the definition is necessary for purposes of identification.

Purity Rubrics.—The object of purity rubrics and assays is to secure preparations and drugs of standard quality. If the same ends can be attained by the use of simpler tests, there is obviously no reason for employing difficult and laborious tests. This being granted, as a matter of course, several purity rubrics and assays could be advantageously omitted. No purity rubric of 99.5 per cent. or an assay is needed for mercury. If the mercury is of the proper appearance, it is necessarily more than 99.5 per cent. pure; in fact, it is nearly 100 per cent. pure. The assay of sulphur is a difficult one and not infrequently runs amuck. Is this assay really necessary to insure a product of the desired purity? The good appearance of the sulphur in connection with a limit for non-volatile matter, and a few more simple tests if needed, will insure as pure a product as is afforded by an assay. Why then burden the users of the Pharmacopoeia with unnecessary work? Most probably the assay of sulphur and a few other similar official assays are very little used and then only as a matter of formality.

Tests for Impurities.—In the Ninth Revision of the U. S. P. greater definiteness has been achieved in the description of chemical tests than in former revisions, but perfection has not been reached —if it ever will be. Because of the extensive and growing use of Pharmacopoeial standards and methods of testing, the tests for

impurities should be made of a more definite character wherever possible. Such expressions as "slightly acid," "slightly turbid," etc., have always been deprecated. They have been a source of uncertainty and worry to the conscientious, and, on the other hand, a good excuse for foisting on the public inferior products. With the number of persons engaged in testing U. S. P. preparations rapidly increasing, the possibilities of attaching different interpretations to these expressions is multiplied and it becomes very necessary to guard against it.

Quantitative or semi-quantitative tests should therefore be adopted for permissible impurities wherever such tests are available, when they are not difficult of execution, and can be made without the use of elaborate apparatus. For instance, instead of "slightly acid or slightly alkaline" a titrimetric limit for acidity or alkalinity should be given. Turbidimetric comparison tests can likewise be used for chlorides, sulphates, and similar impurities. These tests should preferably be described under a general heading in Part II, as the test for arsenic in the present edition. The advantage of this method is very obvious. The tests can be described with more detail and greater clearness, and thus promote greater accuracy and uniformity.

In describing tests for impurities, no detail should be omitted which is conducive to more harmonious results. As an example, the method of preparation of saturated solution of the substance to be tested may be cited. Not infrequently diametrically opposed reports have been made because of the different methods used in preparing the saturated solution.

In salts containing water of crystallization, the U. S. P. assays frequently fail in their object. A deficiency in purity may be concealed by a deficiency in water. For example, sodium phosphate or thiosulphate of sub-standard purity may still show the required purity of the assay and thus defeat the object of the U. S. P. To remedy this defect, it is suggested that suitable tests, limiting the proportion of such impurities as are likely to be present and are not taken care of by the assay, be introduced. In the instances cited above, a test for limit of sulphate will be appropriate. Another method to overcome this is to assay the dried (anhydrous) salt. The latter procedure, however, is not always practicable.

Assays.—The introduction in the Ninth Revision of the U. S. P. of general assays for alkali salts of organic acids and for halogen

salts has proved very satisfactory. It is recommended that this be extended to other assays which are frequently used in the U. S. P., such as tests for acids, ferric salts, zinc salts, benzoates, and salicylates.

It is further suggested that wherever such assays are available and are not unduly laborious, the active principle of the substances be determined. In calcium chloride the calcium should be estimated and in sodium benzoate and salicylate the respective acid determined. The correctness of this recommendation is self-evident.

Test for Zinc.—The U. S. P. test for heavy metals takes no cognizance of zinc. Although contamination of U. S. P. products with this metal is not of frequent occurrence, it is desirable to make provision against its presence in undue proportions. It is therefore recommended that a test for zinc be included in the heavy metals test.

Drying to Constant Weight.—It is highly desirable that this expression, so frequently used in the Pharmacopoeia, be defined. A definition of this term will be of particular value in the determination of water in soaps and other products of similar character. It is impossible to *strictly* dry soap to constant weight. After the water has been presumably expelled, soap will keep on losing in weight to a small extent on further drying, and occasionally a gain in weight has also been noted. A definition along the following lines might answer. The expression "*dried to constant weight*" is intended to mean that two consecutive weighings, after drying for an additional hour, do not differ by more than 0.1 per cent.

Unweighable.—It is recommended that the term "negligible" be used instead of "unweighable," retaining for it the same definition as is now used for unweighable.

Test Solutions.—The majority of U. S. P. test solutions are made up to 10 per cent. regardless of whether the substance is anhydrous or contains 60 per cent. of water. The solutions bear no relation to each other. This is not in keeping with good scientific practice. It will suffice to note that whereas diluted hydrochloric acid is nearly triple normal, diluted nitric acid is $1\frac{1}{2}$ normal and diluted sulphuric acid is double normal. It is recommended that in the next revision test solutions be prepared on the normality basis. The advantages of this system are very obvious. As a matter of fact, this is not an innovation. Several of the test solutions now official—silver nitrate T. S., potassium permanganate T. S., sulphocyanate, and sodium thiosulphate, are made up on normality basis.

Volumetric Solutions.—It is further suggested that the "V. S." following the designation of the normality, *e.g.*, "tenth-normal sulphuric acid V. S.," be omitted. It is practically tautology.

Thermometers.—The thermometers official in the present U. S. P. are almost unobtainable and furthermore there seems to be no need for several of the thermometers specified. It is suggested that in the next revision a more readily obtainable type of thermometer be adopted and their number reduced to a more practical basis.

BOTANY AND PHARMACOGNOSY.

The following recommendations are respectfully submitted to the General Committee:

1. That the Sub-Committee on Botany and Pharmacognosy be given authority to investigate the source of certain official substances like Saigon Cinnamon, Asafoetida, etc., which are at present of either indefinite or partly indefinite origins.

2. That this Sub-committee make a searching inquiry into plant names that are adopted to represent the botanical origins of vegetable drugs, to determine priority in accordance with the Vienna Code.

3. That histological descriptions be given in the text of the U. S. P. for all crude drugs considered therein, which possess cellular structure.

4. That the range in width of the medullary rays of various drugs be based on studies of longitudinal-tangential sections.

5. That the limit of ash for all drugs be revised in accordance with the latest data.

6. That the family name be the sole group name to follow natural origins in the drafting of official definitions for drugs of vegetable or animal source.

7. That the list of plant synonyms be carefully revised.

8. That a limit of impurities be stated in the definition for *Prunus Virginiana* and that this be fixed tentatively as "not more than 3 per cent. of wood or other foreign matter."

9. That a determination of the crude fiber allowable in powdered wild cherry bark be made, to the end that a limit of impurities be placed on the powdered or ground drug.

10. That the term "micron" be employed in the next revision of the U. S. P. in place of "millimeter (mm.)" for designating the size of microscopic objects and that a statement be placed in the

Preface as to the reason for this change, which is that the micron is the standard unit of microscopic measurement.

11. That a limit for extraneous matter be fixed by the U. S. P. in each definition of a vegetable drug where such contamination is unavoidable.

NOMENCLATURE.

The following suggestions are respectfully submitted for consideration:

1. That the general style of the present Pharmacopoeia in the arrangement of Latin and English titles and of synonyms and abbreviations be continued.

2. That changes in official titles, Latin or English, be made only for very important reasons and that conservatism be the basic policy in dealing with all propositions which involve changes in titles which have already become more or less fixed by custom.

3. That in the adoption of new official titles, practical consideration, especially with reference to their use in prescriptions, be deemed of greater importance than matters of etymology, or of classical analogy.

4. That with the introduction of new drugs, which have entered commerce under a vernacular title, the names be in every instance Latinized by the appending of a Latin ending, and not introduced unchanged as Latin titles in the Pharmacopoeia, to be classified as indeclinable nouns. In other words, that the list of indeclinable nouns like Buchu, Gambir, Sumbul, etc., be not extended. This recommendation does not, however, imply the suggestion that indeclinable nouns already in the Pharmacopoeia be changed.

5. That when a new chemical is made official, the name be Latinized by adding the termination, either "*a*" or "*um*," according to analogy or according to the nature of the chemical in question.

That means that third declension endings be avoided and that the names of newly added chemicals be given terminations which will relegate them either to the first or to the second declension. This practice will greatly facilitate correct usage in prescription writing.

6. That cumbersome chemical names, such as Sulphonethylmethanum, which cannot be expected to become an integral part of prescription nomenclature, be avoided, and that short coined names be used instead.

7. That the spelling of "gramme" be retained for the unit of metric weight, to avoid confusion with "grain" in handwritten formulas and prescriptions.

8. That the term "Mil" as the unit of liquid measure be continued.

9. That in the constructing of new titles, either for chemicals or preparations, the use of names which are therapeutically suggestive, be avoided; but this suggestion does not imply that we favor the replacing of such well-fixed titles as compound cathartic pills.

10. That the abbreviations given under the official title in each monograph in the U. S. P. be carefully revised. It would seem to us that abbreviations which go no further than the dropping of a final "*a*" or any other declension ending, should be avoided.

11. That Latin titles in the index be accented, or that a complete list be printed of all official Latin titles with the accent indicated, or better, with accent and diacritical marks in conformity with the English pronunciation of Latin words.

A list of the Latin titles of the U. S. P. IX, with accents indicated, as suggested by Wallace S. Truesdell, A.M., Instructor in Latin at the Philadelphia College of Pharmacy, is herewith appended with the hope that it may be of assistance in the next revision.

12. We recommend that the title "Virus Vaccinicum" be replaced by the title "Virus Vaccinum." That the title "Serum Antidiphthericum" be replaced by "Antitoxinum Diphthericum." That the title "Serum Antitetanicum" be replaced by "Antitoxinum Tetanicum." That the adjective "purificatum" be avoided in the titles of sera and antitoxins.

GALENICALS.

Acidum Hydriodicum Dilutum.—The heating of the solution of potassium salts seems to be unnecessary. The directions to heat should be omitted.

Aquae Aromaticae.—The use of insoluble distributing substances of all kinds (purified talc, purified siliceous earth, and filter paper), should be omitted from the general process, and the direct addition of the medication to the distilled water, and the distillation method only be retained. By the direct addition of volatile oils, creosote, powdered camphor, etc., satisfactory waters may be prepared and the contamination which so often results from the use of these foreign

agents be avoided. Waters made in this way may be truly sterile and will keep much better than when made by the present general formula.

Ceratum Cantharidis.—If practicable a physiological test for the activity of cantharides cerate should be introduced.

Ceratum Resinae.—There should be a slight change in the directions so that the rosin will not separate during cooling. It would be better to direct that when the melted mixture is strained, it be stirred continuously until it starts to congeal.

Elixir Aromaticum.—The use of purified siliceous earth is preferable to purified talc, as it filters more rapidly and produces a brilliantly clear elixir.

Extractum Cannabis.—Glucose is not a satisfactory diluent because of the resinous character of this extract. It is suggested that rosin or some other more suitable substance be experimented with as a diluent.

Glyceritum Acidi Tannici.—The direction to strain the solution through cotton, while warm, is impracticable. The agitation of the mixture in a wide-mouthed bottle, is also difficult. It would be better to stir it with a heavy glass rod or wooden paddle.

Infusum Digitalis.—Reintroduce the 10 per cent. of alcohol, heretofore directed for infusion of digitalis. The infusion as now prepared often ferments before the patient can use all of it, and the small percentage of alcohol is not objectionable.

Linimentum Ammoniae.—Peanut oil can very satisfactorily replace oil of sesame. The latter oil is difficult to obtain and expensive, as it is imported, and peanut oil produces a superior emulsion and is an American product.

Linimentum Camphorae.—Peanut oil can also be used in this liniment to advantage, replacing the cottonseed oil which is a semi-drying oil and unsatisfactory for external application. It would be desirable to introduce here a more practicable assay. The evaporation method is sufficiently accurate and may be easily applied without special apparatus.

Liquor Cresolis Compositus.—The formula submitted by Mr. Samuel L. Hilton (*J. A. Ph. A.*, p. 759, 1919), directing the use of sodium hydroxide and oleic acid for the extemporaneous preparation of soap in this solution, is approved. The formula is as follows:

Cresol	500 Gms.
Oleic Acid	226 Gms.
Sodium Hydroxide	35 Gms.
Water, sufficient to make	1000 Gms.

Dissolve the sodium hydroxide in 100 Mils of water and filter the solution through asbestos. Weigh the oleic acid in a tared vessel, add the cresol, and stir thoroughly. Now add the solution of sodium hydroxide, stir vigorously until saponification occurs, and finally add sufficient water to make the solution weigh 1000 Gms.

Liquor Ferri Chloridi.—This solution is described as "reddish brown" in color. It is more nearly "yellowish brown."

Liquor Ferri Tersulphatis.—The description here is "yellowish brown." It should be "reddish brown." The color descriptions of these two solutions were evidently confused.

Liquor Formaldehydi.—Methyl alcohol is specified in this solution, to prevent polymerization. It would be desirable to permit the use of either methyl or ethyl alcohol.

Liquor Magnesii Citratis.—The use of talc in this solution is unnecessary and undesirable. Partial sterilization of the product, as directed in the present Pharmacopoeia, is unnecessary when the solution is sold within a few days, and only adds to the time necessary for its preparation. If the solution is to be kept for any length of time, it should then be properly sterilized. This can best be accomplished by heating the completed solution in stoppered bottles in an Arnold sterilizer, or steam boiler.

Liquor Plumbi Subacetatis.—This preparation may be made equally satisfactory by mixing the lead oxide with the solution of lead acetate, agitating occasionally during seven days and filtering. Heating for one hour evaporates the solution continuously, necessitating the addition of more water and usually causing considerable precipitation of lead as carbonate. The cold maceration method has been used for a number of years in large laboratories and also on a small scale and the resulting product frequently tested and found to be identical with that prepared by the hot process.

Magma Magnesiae.—The suggestion of Sister Bertha Mueller (THIS JOURNAL, p. 162, 1920), that this magma be made by triturating commercial light magnesium oxide with lime water, has been found an improvement over the present official method and should be carefully tested for possible U. S. P. use. The minute quantity of calcium present is not objectionable and all washing of the magma is avoided. The formula is as follows:

Light Magnesium Oxide, U. S. P.	60 Gms.
Solution of Calcium Hydroxide, U. S. P., sufficient to make	1000 Mils

Add the light magnesium oxide gradually and with constant stirring to 800 Mils of the solution of calcium hydroxide, contained in a graduated jar of at least double the capacity required for the mixture. Then add enough of the solution of calcium hydroxide to make the product measure 1000 Mils and shake or stir the mixture vigorously at frequent intervals until it has thickened properly.

Mistura Cretae.—This mixture can be prepared so that it is permanent and ready for instant dispensing, as follows:

Add 1 Mil of oil of cinnamon to 200 Gms. of compound chalk powder. Gradually and thoroughly triturate this powder with 400 Mils of cinnamon water. Transfer the mixture to a graduated bottle and add sufficient cinnamon water to make the product measure 1000 Mils. The preparation of this mixture before actually needed usually assures a more perfect suspension of the chalk, due to more careful trituration. The added oil preserves the mixture indefinitely and increases its palatability. The mixture is ready for instant dispensing and will not ferment within a few hours when kept by the patient, as frequently occurs when the official mixture is dispensed. This new formula has been tried under all manner of store conditions and temperatures, and has been found to keep indefinitely.

Mucilago Acaciae.—It is suggested that the official mucilage be made extemporaneously from granulated acacia. This is the almost universal custom and if a granulated acacia is selected, of official quality, the product is entirely satisfactory.

Oleoresins.—The Pharmacopoeia has alternated on the solvent used for oleoresins in each of the recent revisions. In one decade it was acetone, in the next, ether, for all of the oleoresins except cubeb. It is suggested that either solvent be directed, except in oleoresin of cubeb, as they seem to be identical in action. This will permit the use of the one which is readily obtainable or the one which is most economical.

Oleum Aurantii and Oleum Limonis.—The addition of 5 per cent. of a fixed oil, preferably olive oil, to these citrus oils, has been found to preserve them indefinitely from the development of turpentine-odor. There would be no serious objection to the Pharmacopoeia recognizing this method of preservation, as it would mean the use of oils of satisfactory quality in elixirs and elsewhere, instead of the frequent employment of oils having a turpentine-like odor. The added olive oil would separate from most of the mixtures and could

be filtered out. The percentage which is used could easily be checked by an evaporation test. Samples preserved in this way under the most trying conditions have kept for more than ten years. The same oil unpreserved became turpentine-like in a short time.

Phenol Liquefactum.—Add the following note to the official text: When phenol is to be mixed with collodium, fixed oils, or petrolatum, use melted crystalline phenol instead of liquefied phenol.

Spiritus Aetheris Nitrosi.—The manufacturing process of the U. S. P. for spirit of nitrous ether should be omitted. There should be included in the U. S. P. a standard for ethyl nitrite as now sold. The spirit of nitrous ether of the U. S. P. should then be directed to be made from definite weights of this standard ethyl nitrite and of alcohol.

Syrupus Aurautic.—It is recommended that the talc be omitted and the following formula used:

Tincture of Sweet Orange Peel	50 Mils
Citric Acid	5 Gms.
Glycerin	100 Mils
Syrup, sufficient to make	1000 Mils

Mix the tincture with the glycerin and then add the syrup in which the acid has been dissolved. The syrup is not entirely clear but its flavor is superior to that prepared by the U. S. P. IX method.

Syrupus Hypophosphitum.—Direct the calcium hypophosphite to be dissolved in the water with the aid of the hypophosphorous acid as the first step in the making of the syrup; otherwise there is often difficulty experienced in obtaining its solution.

Syrupus Ipecacuanhae.—Acetic acid should be omitted from the formula, as hydrochloric acid is used in the fluidextract when made according to the Pharmacopoeia formula.

Syrupus Lactucarii.—We recommend the process for this syrup suggested by Beringer (THIS JOURNAL, p. 315, 1909), as follows:

Las ucarium	50 Gms.
Glycerin	250 Mils
Sugar	600 Gms.
Stronger Orange Flower Water	100 Mils
Distilled Water, sufficient to make	1000 Mils

Mix the lactucarium with 400 Gms. of clean sand by thorough trituration. Place the mixture in a percolator, and without packing, pour on sufficient of a mixture of the glycerin, orange flower water,

and 300 Mils of distilled water to saturate the powder had leave a stratum above. Close the percolator and macerate the drug for two days. Then percolate slowly, using the remainder of the mixture and afterward sufficient distilled water to yield 700 Mils of percolate. Dissolve the sugar in this percolate with the aid of the heat of a water bath, strain if necessary, and finally add sufficient distilled water to make 1000 mils.

Syrupus Senegae.—The present U. S. P. product is unsatisfactory because it frequently precipitates. The direct addition of the fluid-extract to syrup naturally causes this difficulty. A far superior syrup, pharmaceutically, can be produced by the process suggested by Beringer (THIS JOURNAL, p. 320, 1909), as follows:

Senega, No. 20 powder	200 Gms.
Ammonia Water	20 Mils
Glycerin	100 Mils
Sugar	750 Gms.
Water, a sufficient quantity to make	1000 Mils

Mix the ammonia water and glycerin with 200 Mils of distilled water, moisten the drug with sufficient of this menstrum, and pack it lightly in a percolator. Allow the moist drug to macerate for twenty-four hours, and then percolate into a receiving vessel, graduated to 800 Mils, and containing the sugar; use first the remainder of the menstrum and then sufficient water to make the sugar and percolate measure 800 Mils. Reserve this portion and continue the percolation with chloroform water until the drug is exhausted. Evaporate this second percolate to 200 Mils, add it to the reserved portion, agitate until the sugar is dissolved, strain the syrup, and add sufficient water to make the product measure 1000 Mils.

Tinctura Zingiberis.—It has been shown that 75 per cent. alcohol extracts all of the active constituents of tincture of ginger. The resulting product will have to be restandardized from the standpoint of maximum and minimum extraction.

Troches.—Troches should be either omitted from the Pharmacopoeia or modernized as to flavor and size. The principle of making all troches 1 Gm. in weight has proven very satisfactory in the N. F. The cubeb troche is probably the only one of the official troches which is needed.

Unguentum.—Yellow wax produces a better product than white wax, and the color is not objectionable. The ointment is smoother and seems to be preserved more satisfactorily.

Unguentum Acidi Borici.—Paraffin is not a satisfactory hardening agent in this ointment. White wax or spermaceti would be better. Paraffin always causes the ointment to become granular.

Unguentum Aquae Rosae.—The expressed oil of apricot kernels should be recognized by the Pharmacopoeia and used in this ointment. This expressed oil is an American product, seems to be as satisfactory as expressed oil of almond, and is much less costly. As a matter of fact, it is probably used in the preparation of this ointment in most instances at the present time, and its use should be acknowledged.

Unguentum Belladonnae.—The addition of 5 per cent. of yellow wax to this ointment, replacing an equivalent amount of benzoinated lard, greatly improves the product, which is usually too soft.

Unguentum Chrysarobini.—Omit the directions to strain the product, as this seems to be unnecessary and an undesirable manipulation.

Unguentum Diachylon.—It ought not to be necessary to strain the lead plaster and petrolatum in this ointment.

Unguentum Hydrargyri Dilutum.—This ointment has been found to be too soft in consistence for normal conditions. By replacing 40 Gms. of the petrolatum with yellow wax, a more satisfactory product is obtained.

Unguentum Hydrargyri Nitratis.—The formula given in the Pharmacopoeia is satisfactory for small lots of ointment. In the directions it should be made more clear that after the nitric acid is added to the melted lard, the heat should be very gradually increased until the characteristic reaction is complete. It is important also to state that the solution of mercuric nitrate should be incorporated with the nitric acid-treated lard before it has become cold.

Unguentum Hydrargyri Oxidi Flavi.—Ointment of yellow mercuric oxide is chiefly used for ophthalmic purposes and the strength is then about one per cent. An ointment of this strength should replace the official ointment or be introduced as a "diluted ointment of yellow mercuric oxide." This should be made with a petrolatum base.

Unguentum Zinci Oxidi.—Persistent efforts have been made to authorize the substitution of the benzoinated lard in this ointment with petrolatum. Doubtless superior keeping qualities are exhibited by the modification, but the therapeutic value of the ointment is changed. It has been repeatedly observed by physicians

that this ointment owes its value as a healing ointment to the fact that the lard vehicle is quickly absorbed, leaving the coating of zinc oxide which exerts astringent and healing effects. On the other hand, when petrolatum is used, the surface remains moist, and the chafing on a skin surface is not relieved. The present official ointment should be made from a benzoinated lard of high quality, practically anhydrous, and if so prepared, and especially if preserved in tubes, it will keep for a long time without becoming granular.

(To be continued.)

WHAT OF THE DAY? AND WHAT OF THE FUTURE IN PHARMACY?*

By Henry M. Whelpley, M.D., Ph.M.

St. Louis, Mo.

We are living in a day of industrial, economic and social relations, new to even the older ones in the present generation. The World War set in motion waves of human thought which are difficult to measure and impossible to escape. The wage earners have raced with the profiteers in an effort to outdo each other in extravagance. The demand for non-essentials has taxed the capacity of production. This has reduced the facilities and available labor for the production of essentials until prices have reached fabulous figures. The man of salary has been caught between two millstones and is now a pitiable looking individual of tattered and torn clothing and body.

The mind of man has a black reversion to selfishness in great contrast with the humanitarian spirit of pre-war days.

We fought for a larger cycle of liberty of human thought and action. We are now fettered and burdened in a way and to an extent that is difficult to comprehend. We are ready to admit the possibility of the incredible.

Such is the day during which we live and move and have our being at the time of the forty-second annual meeting of the Missouri Pharmaceutical Association.

Will our successors of the next generation look back on us with pity or with an expression of envy of "the good times they had but knew not?"

* Read at the 1920 meeting of the Missouri Pharmaceutical Association.

I dare not hazard a guess in answer. I will say that we can make no calculation for the effective operation of the human mind nor set bounds to its operation. It is difficult to separate the psychological from the material features of the situation. But we feel safer in analyzing the economic condition.

A lull in the retail demand is sufficiently general to attract our attention. The highest priced goods are not bought with the recklessness that they were a month ago.

A credit strain, first acute in the East, has spread far westward. A reaction is at hand. But neither the true nature nor the full extent can be stated with certainty. Please do not say nor even think "calamity howler." That is just what I am anxious to counteract. This is no time to rock the boat.

Cool, deliberate judgment is now at a premium. The situation is aggravated by magnification and made more dangerous if belittled. The real truth of the situation may not be apparent any more than was the outcome of a great battle on the eve of a conflict. But what goes up must come down, and prices must, somehow, recede. Now, what of the future in pharmacy? That depends on the good judgment and wise action of those who are in business to-day.

Druggists are by education and training taught to be cool, but alert in time of accident and emergency. Their daily work has to do with human lives which are in the balance.

Of all in the commercial world, none is so well fitted as the druggist to help the pendulum swing back, slowly and safely, until deflation reaches a point where normal conditions staple equilibrium.

This is a time for action rather than high-sounding statements.

Never be out of staple goods if you can obtain them. Buy less luxuries and discourage their sale.

Collect with vigor all accounts.

Refuse long credits and avoid even short ones, in so far as you can.

Discount all of your bills. Do this even though you must burn less gasoline in order to find the money to meet business obligations.

The realm of human activities to-day does not present more worthy opportunities than those now before you for superior and laudable achievement in guiding along safe and sane lines the process of retrenchment not yet everywhere apparent. Help hold down

speculation, but believe that legitimate business must and will go on. Use your efforts to bring about recessions in an orderly manner. Carry the message of thrift and reduction into every drug store, not only of Missouri, but of this great country where resources and markets are enormous when compared with any other country of the world.

Do this, and when we hear the cry, "Watchman, what of the night?" the answer will be, "All is well in drugdom."

PHARMACEUTICAL EVENTS IN 1870.*

By Otto Raubenheimer, Ph.M.

Brooklyn, N. Y.

In connection with the Golden Jubilee of the New Jersey Pharmaceutical Association it might be of interest to learn what other important events in the field of pharmacy and allied sciences have taken place in 1870, the year of the birth of the Association. The arrangement of the paper, in conformity with a number of others presented at the Historical Section of the A. Ph. A. on the subject "Pharmaceutical Events a Century Ago," is as follows:

1. Of General Interest.
2. Events, Pharmaceutical, Chemical, etc.
3. Inventions and discoveries.
4. Bibliography.
5. Pharmacists and others born in 1870.
6. Pharmacists and others who died in 1870.

OF GENERAL INTEREST.

March 30, 1870—the 15th Amendment of the Constitution of the United States was ratified, *viz.:*

"The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State, on account of race, color, or previous conditions of servitude."

May 25—Organization of English Committee to revise an authorized version of the Bible.

* Read at the meeting of the New Jersey Pharmaceutical Association, Newark, June, 1920.

July 19—France declares war on Prussia and the Franco-German war began.

Dec. 25.—Mount Cenis tunnel completed and becomes the principal route of transportation, also of drugs between Italy and Western Europe.

EVENTS PHARMACEUTICAL, ETC.

Above all the New Jersey Pharmacuetical Association was founded in 1870 and has been in existence uninterruptedly ever since. This event is undoubtedly presented in another paper at the Golden Jubilee.

In the same year the West Virginia and also the Vermont State Pharmaceutical Associations were formed. As a matter of record I might mention that the California Pharmaceutical Association was established in 1869 and the one of Maine in 1867.

Allgemeiner Deutscher Pharmazeuten Verein, the association of German drug clerks, was constituted on January 4, 1870. In 1900 its name was changed to Pharmazeutische Vereinigung.

The U. S. P. Convention, or as it was then called, National Convention of 1870 for Revising the Pharmacopoeia, was held in Washington on May 4. In the committee of 15 only 4 pharmacists were represented, namely, John M. Maisch, of Philadelphia, Albert E. Ebert, of Chicago, J. R. Moore, of Baltimore, and G. F. H. Markoe, of Boston.

Anton Schürer von Waldheim acts as representative and later as director of the Allgemeimer Oesterreichischer Apotheker Verein, the Austrian Pharmaceutical Society. He gained international fame by his project of an International Pharmacopoeia, for which he submitted a draft at the International Congress of Pharmacy at Brussels in 1885.

Rhode Island Pharmacy Law was enacted.

Dr. William Simon (1844–1916) professor of chemistry in Baltimore and well known to the pharmaceutical and medical and dental professions, came to the United States from Germany.

Frederick August Flueckiger, pharmacist, chemist, and above all pharmacognosist, was appointed extraordinary professor at the University of Bern, Switzerland.

Daniel Hanbury, the English pharmacognosist, retires from retail pharmacy in London. The Hanbury medal and Flückiger-Hanbury's Pharmacographia are living testimonials.

Still another pharmacognosist, Prof. August Wiggers, of Göttingen was honored by the so-called Wiggers Stiftung, an endowment for pharmacy students.

Ferdinand Tiemann, discoverer of synthetic Vanillin from Coniferin, became assistant to August Wilhelm Hofmann, professor of chemistry, University of Berlin, the discoverer of fuchsin (1858), which laid the foundation for the aniline industry in Germany.

George M. Ebers was appointed professor at the University of Leipzig. This egyptologist became famous through finding and acquiring the Papyrus Ebers in 1872 in Thebes, which formulary was written about 1600 B.C. and serves as an excellent illustration of the old Egyptian materia medica.

Oswald Schmiedeberg, the celebrated pharmacologist of digitalis fame, was called to a professorship at the University Dorpat.

INVENTIONS AND DISCOVERIES.

Condurango, long a household remedy in the northern part of South America, against snake bites, cancerous and syphilitic diseases, was introduced into the materia medica of the United States by Drs. Caesares and Equigureu, of Loja, and Dr. Thomas Antisel, of Washington, D. C.

In March, 1870, Cloëz reports in *Journal de Pharmacie et de Chimie*, 4 series XII, 291, an elaborate study of Eucalyptus leaves. The drug was then introduced into medicine and the tree was planted in malarial districts.

The manufacture of Sulphuric Acid Anhydride, SO_3, began by Cl. Winter, in Freiburg, Saxony, and by Messel & Squire, near London.

Marcellin Berthelot, pharmacien, professor, senator and member of cabinet, synthesized Benzene or Benzol, C_6H_6.

Friedel and Craft synthesized aromatic hydrocarbons.

C. Gräbe, of Geneva, determined the constitution of Anthracene and Phenanthrene.

Oswald Hesse discovers four more alkaloids in opium, namely, codamine, Laudamine, Lanthopine and Meconidine.

Hesse determines the molecular formula of the opium alkaloid Thebaine, isolated by Thibourney in 1835, as $C_{19}H_{23}O_3N$.

Hesse also determines the constitution of Narcotine.

C. R. A. Wright completes his researches on the chemical structure of Morphine, began in 1860.

S. M. Jorgensen, of Copenhagen, introduces the polyiodide test for the detection of alkaloids.

Dr. Wilhlem von Brugge (1819–92), professor of physiology at Vienna, introduces emulsion test for fatty acids.

Prof. Adolf von Baeyer, of Munich, of synthetic indigo fame, works on Mellitic Acid, on Purine derivatives and Uric Acid. He determines the constitution of Furfural and Pyrrol and invents the process of the formation of Hydrocarbons by reduction with Hydriodic Acid and Phosphorus.

Justus von Liebig, the father of agricultural chemistry, discovers Invertase. He also publishes his last book of importance "Uber Lösung und Quelle der Muskelkraft."

J. Lothar Meyer (1830–95), professor at Karlsruhe and later at Tübingen, works on molecular volume and completes his researches on the periodic system, began in 1861.

Oskar Liebreich, dozent and later professor of pharmacology, Univ. Berlin, determines the structure of Betaine, the alkaloid in beet-juice, discovered by Scheibler in 1866.

Prof. L. I. Mendeleeff, of St. Petersburg, begins his work on critical data of gases, 1870–85.

Prof. Robert Wilhelm Bunsen, at Heidelberg, of "Bunsen-burner fame," invents Ice Calorimeter, an apparatus for determining specific and latent heat of bodies.

Ethylidine Chloride or Ethylene Chloride, CH_3CHCl_2, was introduced as an anesthetic by Prof. Bernhard von Langenbeck (1810–87), of Berlin, the greatest clinician, surgeon and teacher of his day in Germany.

Gelatin suppositories and Vaginal Globules introduced by Apotheker Grohs in Vienna, later Baron Grohs von Figely.

Petroleum burners replace the old Berzelius lamps.

Gruner recommends the steam turbine as a motor for the pharmaceutical laboratory.

Apotheker Reeb, of Strassburg, introduced oil and syrup shelf bottles with cup-shaped neck to collect the drippings.

Eugen Dieterich, of Helfenberg, manufactures paper bottle caps with a machine invented by Enzmann.

That even the Franco-German war acted as a stimulant to chemistry, pharmacy and medicine, can be seen from the following innovations.

Smokeless powder was invented.

Phosphorus Pills were issued against rats and mice.

Phenol, after being used as a disinfectant on the battlefield, came into general use.

Purified or Absorbent Cotton began to be used for dressing and Iron Chloride Cotton as a styptic.

Lana Pini, or Pine Needle Wool, was invented by Weiss, a paper manufacturer in Zuckmantel, Germany, and used as a substitute for the expensive cotton. Furthermore, two important industries were developed, the manufacture of pineneedle oil and pineneedle extract.

BIBLIOGRAPHY.

The publication of the Yearbook of Pharmacy of the Conference of the British Pharmaceutical Society was commenced.

British Homeopathic Pharmacopoeia published.

The 13th edition of the United States Dispensatory, containing 1800 pages, was published.

Franz L. Sonnenschein (1817–79), apotheker and professor of chemistry at the University of Berlin, whose name will live forever by his Reagent of Phosphomolybdic Acid as a precipitant of alkaloids, publishes his "Handbuch der analytischen Chemie."

W. H. Kolbe (1817–1884), famous for the constitution and synthesis of salicylic acid, founded the *Journal für praktische Chemie.*

Pharmazeutischer Zentralanzeiger, the official organ of the German drug clerks, is established.

A. Oppenheim translates into German "Historie des doctrines chimiques depus Lavoisier juisqua nos jours," by Prof. Charles A. Wurtz, of Paris, which contains the sentence "La chimie est une science Francaise," thus giving rise to many arguments by chemists in the Fatherland, who added the slogan, "But chemistry was developed in Germany."

BORN IN 1870.

My list of pharmacists born in that year is rather small.

Nicolas Klein, of Louisville, Ky., born January 9, 1870, was apprenticed to Theo. Ractanus. He died December 29, 1907.

Wm. J. McAdams, of Pittsburg, Pa., born in 1870, and died in 1910.

The author would be pleased to receive short biographies of pharmacists born since 1870, to be incorporated in his historical notes.

DIED IN 1870.

OTTO.

Friedrich Julius Otto, born January 8, 1809, in Grossenhain, Germany, was an apotheker, then teacher, and in 1833 professor at the Collegium Carolinum, Braunschweig, until his death on January 12, 1870. In 1840 he translated Graham's Elements and in 1854 he enlarged same into a master work "Ausführliches Lehrbuch der Chemie." In 1856 he published, together with his son, Dr. Robert Otto, of the University of Greifswald, the classic work "Auleitung zur Ausmittelung der Gifte" and thus became one of the pioneers in legal chemical analysis. He modified and improved the method of the Belgian chemist, Jean Servais Stas, so that the Stas-Otto process of the detection of individual alkaloids is still considered authorative to-day. He was also a collaborator on Bolley's "Handbuch der Technologie."

BOLLEY.

Pompeius Alexander Bolley, born May 7, 1812, in Heidelberg, since 1838 professor in Arau and since 1855 at the polytechnicum in Zurich, Switzerland, until his death, August 3, 1870. In 1852 he published his classic work "Handbuch der technisch-chemischen Untersuchungen." Bolley is also the father of the renowned work in 8 volumes "Handbuch der Chemischen Technologie" (Braunschweig, 1862), in which celebrated scientists of the times were collaborators. He was an authority on coloring substances and in 1868 published "Altes und Neues ans der Farbenchemie." His many researches and those of the students in his laboratory are published in *Annalen Chemie und Pharmacie* and in *Schweizerische polytechnische Zeitschrift.*

EHRMANN.

Martin J. Ehrmann, born 1809, was professor of pharmacy in Brünn and later in Vienna. He wrote a commentary on the Austrian Pharmacopoeia in four volumes. "Lehrbuch der Pharmazie nachdem gegenwarligen Staudihrer Gumdwissusschaften," Vienna, 1826–28 and 1832–33. In 1847 he founded the *Oesterreichische Zeitschrift für Pharmazie.* He died in 1870.

REDTENBACHER.

Joseph Redtenbacher was born in 1810 at Kirchdorf, Austria. He advanced to professor of chemistry and attained fame through his work on glycerin and the preparation of oenanthylic or heptical acid, $C_6H_{11}COOH$, by the oxidation of oleic acid with nitric acid. Redtenbacher died in 1870.

BLASIUS.

Johann Heinrich Blasius was born, October 8, 1908, in Eckerbach, near Cologne. After being a school teacher in Krefeld he became, in 1836, Professor of Natural Sciences at the Carolina University, Braunschweig. Here he was also director of the Botanic Gardens and the Museum of Natural History. He died May 27, 1870.

MAGNUS.

Henrich Gustav Magnus, celebrated chemist and physicist, born in Berlin, May 2, 1802, studied in his home city and Paris and also under Berzelius in Stockholm. In 1831 he became teacher, in 1834 extraordinary professor, and in 1845 professor of physics and technology at the University of Berlin. In 1869 he retired and died April 5, 1870.

Magnus enriched Physics and Chemistry with many important researches. He determined the coefficient of expansion of several gases, the tension of vapors, the density of ice at different temperatures. His papers dealing with electricity, magnetism and hydraulics are published mostly in Poggendorff's *Annalen*.

Although not pharmacists or chemists, the following four members of the medical profession deserve to be remembered here.

SYME.

James Syme (1799–1870) of Edinburg, was a cousin of the celebrated Dr. Robert Liston. He succeeded the latter in his very large Scotch practice as well as his professorship. In clinical surgery his name continues to live by the amputation of the ankle-joint, known as Syme's Amputation. With Simpson and Pirogoff he was the first European surgeon to adopt, in 1847, ether anesthesia. In 1868 he was also the first to welcome the antiseptic method of his best and greatest pupil and his son-in-law, Lord Lister.

COPELAND.

Dr. James Copeland (1891–1970), of the Orkney Islands, was a medical polyhistorian. His Dictionary of Practical Medicine (1834–59) contains 3509 double column pages, all written by himself. As president of the Pathological Society of London, Copeland excited many a chuckle of derision when he claimed various modern discoveries as his own.

GRAEFE.

Albrecht von Graefe (1821–1870), of Berlin, was the creator of the modern surgery of the eye, in fact the greatest of all eye surgeons. In 1854 he founded the Archiv. für Opthalmologie, the leading organ of this special branch of medicine to date. Graefe's clinic became famous all over the world and not only student but practising physicians came to Berlin to study ophthalmology under its greatest master.

SIMPSON.

Although not a pharmacist, but a physician, I must not forget to record the death of Sir James Young Simpson, because he introduced chloroform as an anesthetic. Born in 1811 in Linlithgow, Scotland, as the son of a baker, it was the desire of his parents to have him educated. In 1825 he entered the University of Edinburgh, studied hard, and in 1832, at the age of twenty-one, he graduated as M.D. His thesis, "On death from Inflammation," so impressed the professor of Pathology that he selected the recent graduate as his assistant. In 1840 Simpson became professor of Obstetrics and through his great ability and fascinating personality soon acquired an enormous practice.

The following short account of the introduction of chloroform as an anesthetic is taken from the author's lectures and might be of interest at this time.

Not being quite satisfied with the effects of ether, which he was the *first to employ in obstetric cases,* namely January 19, 1847, Simpson searched for a more lasting anesthetic. He tried many substances, liquids, solids and gases, but without success. A Scotch pharmacist, David Waldie, at that time manager of the Liverpool Apothecaries Company, visited Edinburgh during the summer of 1847 and advised Simpson to try chloroform, promised to send some on his return to Liverpool. However, a fire in the laboratory of his

establishment prevented the fulfillment of this promise. Simpson then obtained a bottle of chloroform from Duncan and Flockhart, in Edinburgh, but owing to its specific gravity, did not consider it of much value. How could such a heavy liquid act as an anesthetic? In the evening of November 4, 1847, a date worth remembering, Prof. Simpson and his two talented assistants, Drs. Duncan and Keith, tried chloroform by inhaling it from tumblers. The effect was instantaneous and remarkable. Dr. Keith's eyes grew bright and he laughed heartily. Dr. Duncan waltzed around the room and Dr. Simpson, the dignified professor of Medicine and Midwifery at the University of Edinburgh, wiggled his toes and would have stood on his learned head for a doughnut. When some ladies entered the room, the three gentlemen were remarkably amiable, loquacious and even hilarious. Little did they dream that these gay Lotharies were drunk—drunk on chloroform. Then the secondary effects of the chloroform vapors became evident, the charming doctors became confused and then unconscious. Simpson was the first to revive. He found Duncan under the table with eyes staring and snoring loudly, while Keith was kicking at the supper table. The experiment was repeated a few evenings later, and this time Miss Petrie, a niece of Simpson, wanted to prove that she was as brave as a man, inhaled the chloroform. She folded her arms across her breast and fell asleep murmuring, "I am an angel! Oh, I'm an angel"—but Simpson searched in vain for her wings. "Better than ether," was Simpson's conclusion. He read a paper on Anaesthetics before the Medico-Chirurgical Society of Edinburgh, calling attention to the superiority of chloroform over ether, and he also began at once to use it in his obstetrical practice and with great success.

Strange as it may seem, all innovations meet with strenuous opposition. And so it was with the introduction of chloroform as an anesthetic in obstetrics. Not only the unscientific rabble shouted at Simpson, but also men of brains and skill opposed the innovation, as Meigs, of Philadelphia, Ramsbotham, of Great Britain, and Scanzoni, of Germany. Even the church opposed this apparent blessing and the orthodox quoted the passage in Genesis III, 16: "In sorrow thou shalt bring forth children." The controversy grew so bitter that had Simpson been a Semmelweis he might have become insane, and had he been a Horace Wells he would have killed himself. But he was the right man in the right place. He had the

courage which defends and the courage which attacks. He was the leader of a great battle and he fought it with a clenched fist. He answered Scripture by Scripture and quoted Genesis II, 21, in which it is related that when the Lord wished to take a rib from Adam in order to make Eve, "God caused a deep sleep to fall upon Adam and he slept." Thus it was proven that God himself made use of anesthetics in difficult operations.

When Queen Victoria herself, on two occasions, availed herself of chloroform as an anesthetic in obstetrics and administered by Simpson himself, then the heretic became a hero, the rebel became a savior: In due time the baker's son had a Sir in front of his name and a Bart. after. The doctor adopted for his coat of arms the rod of Aesculapius over the motto *Victo dolere*! Oxford gave him a D.C.L., Edinburgh has his statute, and his bust stands in Westminster Abbey.

Although not strictly pharmaceutical, I want to record briefly the death of two literary authorities.

DUMAS.

Alexander Dumas (Père) was born in 1802 near Dieppe, the son of one of Napoleon's generals, a Haytian mulatto of ability and education. Dumas became the Walter Scott of France with a succession of historical works which have been the delight of three generations. He died in 1870.

DICKENS.

Charles Dickens, one of the greatest of English novelists, was born in 1812. His "Pickwick Papers" in 1836 won him fame and wealth. His keen description, human pathos, knowledge of child nature, comedy, tragedy and romance, appealing to the average mind, made Dickens one of the most influential writers of the 19th century. He died in 1870.

CONCLUSIONS.

If this paper arouses a little more interest in that much neglected subject, history of pharmacy, the writer is well paid for the trouble he has taken. The sooner the pharmacist will realize that even a little knowledge of history will benefit him, intellectually and also financially, the better will it be for professional pharmacy.

In case the members of the New Jersey Pharmaceutical Association appreciate these historical notes, the author is perfectly willing to promise annually a paper on "Pharmaceutical Events Fifty Years Ago."

COLLOIDAL PREPARATIONS IN MEDICINE.

The June number of *The Prescriber* is devoted almost entirely to a presentation of the use of colloids in medicine. The importance of the subject and likewise the excellence of its treatment leads us to present to our readers copious abstracts from the articles appearing in this esteemed medical cotemporary.

COLLOIDS IN GENERAL PRACTICE.—Under this caption editorial comment is made. Colloid therapy is not only new—it is still very markedly in the experimental stage. The preparation of colloids is, in many instances, no very difficult matter: the difficulty begins in the attempt to make them therapeutically valuable. The general practitioner should satisfy himself that he is using colloids of the right strength, whose therapeutic properties are sufficiently known, which are suitable for internal administration, orally or by intravenous injection.

Speaking generally, a colloid is a solution of some "insoluble" substance—generally an element. For example, colloid silver is a clear red liquid. It passes through a filter and, to all simple tests, answers as would any other solution. The colloid solution referred to is unstable and readily desposits silver as a precipitate. When this occurs it is, of course, colloidal no longer, and any value it possesses as a colloid disappears. It is this precipitation, this disappearance of the colloid as such, which has to be in some way obviated before any colloidal preparation can be of the smallest use in medicine.

The importance of colloids in medicine arises from the fact that most, perhaps all, the fluids of the body are colloidal in character. It is not then to be wondered at that some astonishing results have been obtained from the use of colloids. In many cases it would seem as if, in this way, all the advantages, and none of the drawbacks of the particular drug used, were embodied in the colloidal state. Thus colloidal mercury may be given wherever mercury is indicated; it is only feebly toxic and it is very rapidly absorbed—two striking advantages over the salts of mercury. Similarly colloidal sulphur would appear to be the best possible form for the administration of that element. Ordinary sulphur is not absorbed either in the stomach or elsewhere, whereas colloidal sulphur combines with protein, is rapidly absorbed and is carried to those parts which need it. Again, no colloid has been used with greater suc-

cess than that of silver. The results obtained from the use of collosol manganese have likewise been little short of astonishing. Colloidal iron is of great use in treating anaemia and chlorosis. An interesting fact is that it unites with the amino-acids of the stomach, forming a compound from which haemoglobin is synthesized in the system. Colloidal iodine has been in use for some time and is tolerably well known to the practitioner.

Lastly, it is clearly to be borne in mind that colloidal preparations are not to be relied upon unless they are fresh. As we said above, the colloidal state is essentially unstable; the substance in the form of a colloid is precipitated by the particles of salt which abound in the atmosphere, and even by the minute quantities of matter dissolved from the containing vessel, as well as by forces at present not clearly apprehended.

COLLOIDS AS ANTISEPTICS.—This is another topic editorially commented upon. There is one other property possessed by colloids, however, which is of direct medical interest—their use as antiseptics or germicides. Bacteria, physically considered, are colloidal in character, as are the fluids in which their life-cycle is passed. All colloids—or rather the particles in colloid solution—are electrically charged, either positively or negatively as the case may be. Most substances bear the same charge always, though there are some colloids which, if prepared in one way, are negatively charged, and if prepared in an alternative way, are positively charged. Bacteria are negatively charged, hence, if in any way it is possible to neutralize this electric charge the bacteria are precipitated, and are thus removed from the sphere of deleterious action. The obvious way to neutralize (electrically) a negative sol is to add, in proper proportion, a positive sol. One can thus imagine the power of, and the convenience of using, an antiseptic which has the following properties—that of precipitating bacteria, that of being chemically a germicide, and that of being non-toxic and non-caustic. Such would be the properties of the ideal antiseptic, and such are the properties of certain colloids—those, namely, which bear a positive charge and which are also antiseptic by reason of their chemical properties.

The most valuable colloid by far, in this connection, is colloidal silver. It has approximately the same germicidal action as mercuric chloride, and in addition it is non-toxic, non-caustic, and non-irritating. It has the curious property, when injected intravenously,

of rendering rabbits immune from anthrax and diphtheria bacilli. Again, colloidal silver is interesting in that it has a selective germicidal action upon the pneumococcus and the micrococcus catarrhalis.

The following fact, germane to the present subject, is also of great interest: The progress of any ailment of bacterial origin depends in large measure upon the physical (electric) conditions of the body fluids in which the bacteria reproduce themselves. It is possible so to change these fluids (which we repeat are invariably colloidal) by the injection of colloids prepared in the laboratory that the development of the bacteria is hampered and the progress of the disease checked. Here then is a new method of treating contagious and infectious diseases. Instead of, or supplementary to, vaccines, serums, or ordinary drugs, there is suggested the use of certain colloids which so act upon the "soil" in which the bacteria grow that the latter fail to develop. This branch of colloid therapy is as yet in its early infancy, but it needs no leap of the imagination to picture the possibilities which may be unfolded by research.

COLLOIDAL METALS AND NON-METALS: THEIR HISTORY, PREPARATION, AND PROPERTIES.—Thos. Stephenson contributes a résumé under this title. The first publication in English literature concerning the use of this class of medicines is stated to have appeared in September, 1907. Graham first used the word "colloid" to distinguish certain amorphous substances, of which glue and gelatin are typical examples, which diffuse with difficult through membranes, as opposed to "crystalloids," which diffuse with ease. The word is now used to describe a condition which chemical substances may be made to assume rather than to define a definite class of compounds. A "colloidal solution," or "sol," is not a solution in the strict sense of the term, but rather a suspension of minute particles of the substance.

The nature and properties of colloids and of colloidal sols have been known for some time, but the assumption by the metals and metalloids of the colloidal state is a comparatively recent discovery. It is these that have come into extensive use in medicine. The first metal to be used in this way was colloidal silver, which was introduced in 1896 under the name "collargol." Collargol is sold in the form of small black scales having a metallic luster forming with water an opaque solution. It is not really a colloidal metal but is considered as a combination of an acid silver molecule with ammonia, *i. e.*, collargolate of ammonia.

Shortly after the introduction of collargol, Trillet succeeded in preparing derivatives of certain metals by precipitating solutions of metallic salts with an alkali in presence of albumin, forming a kind of colloidal sols of the metals. Later, Bredig produced true colloidal "sols" of the metals by passing an electric current through pure water between electrodes of the metal to be dissolved. The current diffuses a minute quantity of the metal throughout the liquid—the metal, in fact, becomes volatilized in the liquid. The resulting sol is in every case a dichroic liquid, transparent to transmitted light and opaque to reflected light. The suspended particles in a properly prepared Bredig colloidal sol are so minute that they can be detected only by the ultra-microscope, and they possess the vibratory motion known as "Brownian movement."

The early literature concerning the therapeutic action of these liquids was practically confined to France. A. Robin was the pioneer student in this field. He compared the sols of Bredig first to organic enzymes and then later to antitoxic serums. He is enthusiastic as to their possibilities and describes wonderful effects obtained from them in the treatment of pneumonia, articular rheumatism, puerperal infections, meningitis, etc. The great difficulty attending the use of electrically prepared colloidal metals was their unstableness. The particles had a natural tendency to agglutinate and in consequence the solution did not remain therapeutically active for more than a few hours. Sterilization by heat caused the particles to agglutinate and the same result followed the addition of a foreign substance such as sodium chloride. When injected into the blood, the colloidal sol at once agglutinated and any therapeutic action was consequently nullified. It was found that the introduction of a small portion of another colloid such as gelatin or gum, at a suitable stage in the manufacture, prevented this agglutination and the addition of such a substance known as a "protective colloid" has allowed of these preparations being preserved and isotonized, and this discovery made colloidal metals a commercial as well as a therapeutic possibility.

Electrically prepared colloidal sols are not stable enough for therapeutic purposes, so that the methods now generally employed are chemical ones and in the case of a metallic colloid consist in the reduction of the metallic salt by a suitable agent in the presence of a protective colloid such as gelatin or gum. The metal is produced in a very fine state of subdivision and is kept in this condition by the protective colloid, the by-products are removed by dialysis.

Under the name of "organosols" Martindale describes colloidal metals obtained by impregnation of lanolin with an aqueous solution of the salt of a metal and subsequent trituration with a solution of alkali hydroxide. By double decomposition the oxides or hydroxides of the heavy metals may thus be obtained as colloids, and the product may be dissolved in ether, fats, or in liquid paraffin, the cholesterol acting as the protective agent.

Colloidal sulphur may be prepared by mixing solutions of sodium sulphide and sodium sulphite, adding white of egg and stirring thoroughly; lastly adding dilute hydrochloric acid and dialyzing. Colloidal iodine may be obtained in several forms: aqueous, oil and ointment. Colloidal alkaloids have also been prepared, but their use so far has not become general. Colloidal quinine, curiously enough, has no action in malaria.

Colloidal antimony sulphide is prepared from a solution of tartar emetic with sulphuretted hydrogen. The potassium bitartrate formed is removed by dialysis and glucose is added to make the solution isotonic, gum acacia as a protective, and phenol as a preservative.

For a time it was thought that the therapeutic action of colloidal sols was merely catalytic or mechanical, but it is now believed that other factors are responsible. The results recorded for several of these all point to an intensification of the specific action of the metal, which is probably in the ionic condition. The fact remains that whereas it was originally thought—and, probably, with some reason in the case of Bredig's solutions—that the actual metal was immaterial, it is now known that the different colloidal metals have different therapeutic effects, and cannot be employed indiscriminately.

There is undoubtedly a great future for colloidal remedies and we are now only standing on the threshold of what may be learned about them. Improved methods of preparation will enable fresh colloidal sols to be prepared and will lead to the discovery of fresh fields for their employment and additional laurels for the therapeutist.

THE END OF SIMPLIFIED SPELLING.*

There no doubt has been some surprise, but probably little expressed regret, because of the recent announcement, made by the Modern Language Association of America, that it has withdrawn its sanction of the simplified spelling movement. The reason given,

* From *Montreal Pharmaceutical Journal*, April, 1920.

while not necessarily sufficiently conclusive to warrant the abandonment of a campaign long and vigorously conducted, may, after all, seem to be so. These are the lack of public interest in the proposed new form of spelling, its failure to make any appreciable progress, and its offensiveness to some members of the association. The movement to reform English spelling in the United States took definite shape in the year 1906, when the Simplified Spelling Board was organized in New York City. Many distinguished men and women have, at one time and another, been identified with the campaign, and from the first it was liberally financed. Reams of literature in the form of more or less convincing propaganda, have been printed and distributed throughout the length and breadth of the land, the chief effort, especially early in the campaign, being made to win over the support of colleges and universities through appeals made to their executives or to those employed as professors or instructors. The board published, not long after its organization, a list of 825 American college professors and officers who, it was claimed, had agreed to follow the prescribed simplified form of spelling in the use of 300 words, wherever possible. Further impetus was given to the movement, momentarly at least, in August, 1906, when Theodore Roosevelt, then President of the United States, ordered the public printer to adopt the spelling advocated by the board in the publication of all documents of the executive departments. Due to public protests, this order was modified, a little later, to apply only to the official correspondence of the White House.

It might, perhaps, have been supposed that a movement so thoroughly organized, so liberally financed, and quite generally indorsed by educators in some parts of the country, especially as it had the support and approval of the editors of a number of the more popular dictionaries, must eventually succeed. But the fact remains that it did not succeed. Indeed, it never even approached success. The popular protest which reached President Roosevelt seemed to express the almost unanimous sentiment of the masses. Those who opposed arbitrary innovations along the lines proposed insisted, and apparently with reason, that spelling reform should continue to be, as it always had been, a matter of growth. Those persons who had learned to spell the words in common use quite emphatically insisted upon the right to continue the spellings they had learned. They admitted that many of these spellings were arbitrary, in a sense, but that they were no more arbitrary than the so-called simplified forms prescribed,

and that no method of phonetic spelling could ever be successfully standardized. Perhaps many of the sticklers for the older form may have admitted that there were many words, some of them in quite common use, which they knew "by sight" only, and with which they had no "speaking acquaintance," but they evinced no inordinate desire to be compelled to form unnumbered new acquaintances, as it were, the presentations to be made by writers who claimed the privilege of disguising and camouflaging the English language to suit their own whims.

There is, of course, a trend toward what all admit to be, or claim to be, a "modern" form of spelling. Even a cursory examination of the accepted forms in use to-day would be convincing of the accuracy of this statement. But it might be quite difficult to bring convincing argument that the changes involved had ever been arbitrarily made. Tennyson and Swinburne employed, in the spelling of many words, forms quite different from those followed by Shakespeare and Bacon, and, no doubt to those earlier writers the forms employed by Wyclif appeared antiquated, if not grotesque. The change from one form to another has been gradual and almost unnoticed, as are the changes to which all become accustomed in dress, and even in so-called correct forms of etiquette. There is evidently no need to tell a people that its language is indefensible etymologically as well as on grounds of accepted usage. But it has been proved apparently, that its merit of familiarity is its sufficient defense.

THE SELECTION OF GLASS FOR THE MANUFACTURE OF AMPULS.*

By George E. Ewe,

CHIEF CHEMIST, H. K. MULFORD COMPANY, PHILADELPHIA.

The selection of and requirements for glass bottles for storing the ordinary elixirs, fluidextracts, powders, tablets, etc., employed in pharmacy is a crude process, indeed, in comparison with the careful tests required for the selection of a proper glass for the manufacture of ampuls. This care is necessitated by reason of the fact that unselected glass may possess sufficient free alkali, or may be capable of yielding sufficient free alkali under the stress of the

* From *Jour. Franklin Institute*, May, 1920.

sterilization process which ampul solutions are required to undergo, or may yield sufficient alkali in the period during which they are necessarily kept in stock before being sold, to cause the precipitation of a portion of the alkaloidal base of a solution of alkaloidal salt when placed in the ampuls, and because unselected glass may throw off spicules or splinters of glass under the stress of the sterilization process or during storage. It is sufficient merely to point out, in order to show the unsuitability and even danger in the use of improperly selected glass, that precipitation of alkaloidal base will result in the lowering of the efficacy of an ampul solution upon which a physician may be relying in a serious case of illness and the production of spicules or splinters of glass in the ampul solution may result in discomfort, local irritation, or possibly more remote and more dangerous consequences. The use of a slight addition of acid to ampul solutions in an effort to correct for the alkalinity of unselected or improperly selected glass is contra-indicated in view of the fact that glass can be made or selected which requires no use of acid. The use of acid is also contra-indicated because acidity is usually productive of irritation at the site of injection.

In outlining tests for the selection of glass for the manufacture of ampuls the working of the glass under the flame must also be considered. In addition, other tests which may act as checks on the "alkalinity," "spicule" and "flame" tests are frequently resorted to. The series of tests mentioned below will, as a rule, be sufficient for proper selection of glass, if applied "secundum artae." However, the "art," particularly the "flame" testing can be attained only by practical experience.

TESTS FOR THE SELECTION OF GLASS FOR THE MANUFACTURE OF AMPULS.

Size of tubing, thickness of wall, freedom from certain proscribed ingredients, color: in accordance with specifications.

"Working under the flame:" can be judged only by practical experience obtained by comparison of many varieties of glass.

Standard: greatest ease in working consistent with the other requirements.

"Alkaloidal Alkalinity Test"—"General."—A 1 per cent. solution of U. S. P. morphine sulphate or a 0.2 per cent. solution of U. S. P. strychnine sulphate in normal saline solution must not develop crystals or become turbid or opalescent when sterilized under prac-

tical conditions in ampuls made from the glass undergoing test; the ampuls having been treated with dilute hydrochloric acid and finally thoroughly washed free from acid and dried before the alkaloidal solution is placed in them. The preferred test is the "particular" one which is in all respects similar to the "general" test except that the particular solution which is intended to be marketed in the ampuls is used in place of the morphine sulphate or strychnine sulphate solutions.

"*Spicule Test.*"—Work the glass into ampuls. Place a 0.6 per cent. NaCl solution (or any particular solution) in the ampuls; seal and sterilize under practical conditions. The solution is then carefully examined under a magnifying glass for spicules or splinters of glass.

Exact conformity with the above test is absolutely necessary in order to permit the use of any particular glass for the manufacture of ampuls.

The following tests are applicable for comparative purposes only, and are occasionally employed as confirmatory checks:

"*Phenolphthalein Alkalinity Test.*"—Treat the glass with dilute HCl followed by very thorough washing. Boil a sample corresponding to 500 sq. centimeters of surface for 16 hours with distilled water, keeping the sample covered with fresh additions of water as required. Remove the glass, add 1 Cc. phenolphthalein test solution to the water in which the glass was boiled and titrate to neutrality. Make a correction on the water, vessel in which the boiling was conducted, locality in which the test was carried out, etc., by running a blank under precisely the same conditions employed in making the test, and at the same time. Report alkalinity as milligrams of NaOH per 100 sq. cm.

"*Loss to Water Test.*"—The sample used in the "phenolphthalein alkalinity test" is weighed before and after boiling. Report loss as milligrams per 100 sq. cm.

"*Vulnerability to Aklaline Fluids Test.*"—Repeat the "loss to water test," using a new sample, and using 2 per cent. sodium carbonate solution in place of water, keeping up the volume by fresh additions of water only. Report loss as milligrams per 100 sq. cm.

"*Phenolphthalein Alkalinity Autoclave Test.*"—Water containing a few drops of phenolphthalein test solution is placed in the ampul (which has previously been acid-washed and thoroughly rinsed with distilled water); the ampul is sealed and autoclaved at 12 lbs. steam

pressure for 45 minutes. At the end of this time the tube is carefully examined for color and spicules. A pink color indicates alkalinity.

"Phenolsulphonephthalein Alkalinity Autoclave Test."—In all respects this is similar to the preceding test with the exception that a yellowish solution of phenolsulphonephthalein is used instead of phenolphthalein and the autoclaved liquid is examined for any reddish tint which may develop.

The following table shows some typical results obtained by the use of the several tests mentioned above in glass tubing offered for the manufacture of ampuls:

Sample No.	Color.	"Flame" test.	"Spicule" test.	"Phenolphthalein Alkalinity" test.	"Loss to Water" test.	Suitability.
1	Flint	O. K.	None	0.098 Mgm.	0.7 Mgm.	O. K.
2	Flint	Works hard	Spicules	.....	4.2 Mgm.	Not O. K.
3	Flint	Works easily	Spicules	.....	1.9 Mgm.	Not O. K.
4	Flint	Works easily	None	Undeter. trace	0.61 Mgm.	O. K.
5	Flint	Works easily	None	0.102 Mgm.	1.1 Mgm.	O. K.
6	Flint	Works hard	Spicules	.....	Unweighable	Not O. K.
7	Flint	Works easily	None	.....	0.62 Mgm.	O. K.
8	Flint	Works easily	None	.....	0.49 Mgm.	O. K.
9	Flint	Works easily	None	.....	3.2 Mgm.	O. K.
10	Flint	Works easily	A few spicules	.....	4.4 Mgm.	Not O. K.

All of these samples yielded perfect results in the "alkaloidal alkalinity" test. As a matter of fact, after a satisfactory source has been established, it is only occasionally that a sample fails to answer this requirement, but this occasional exception illustrates the necessity for the application of this test.

The relation between the alkalinity yielded in the "phenolphthalein alkalinity" test and the result of the "alkaloidal alkalinity" test was not determined, the "phenolphthalein alkalinity" test being rejected in favor of the shorter and more practical "alkaloidal alkalinity" test.

The phenolphthalein and phenolsulphonephthalein alkalinity autoclave tests are used by some workers, but they are open to the criticism that they bear no practical direct relation to the possible use of the glass for ampul purposes, whereas in the same time and with no more labor a direct result can be obtained by the use of the "alkaloidal alkalinity" test.

The results yielded by the application of the "phenolphthalein alkalinity," "loss to water" and "vulnerability to alkaline fluids" tests to some samples of glass tubing, bottles, Erlenmeyer flasks, test tubes and beakers are herewith appended as a matter of comparison and of interest:

Sample.	Color.	"Phenolphthalein Alkalinity" test.	"Loss to Water" test.	"Vulnerability to Alkaline Fluids" test.
Tubing	Flint	Undeterminable trace	Unweighable	21.0 Mgm.
Tubing	Flint	.....	1.5 Mgm.	....
Tubing	Flint	Undeterminable trace	Unweighable	30.0 Mgm.
Tubing	Flint	.....	1.17 Mgm.	....
Tubing	Flint	Undeterminable trace	Unweighable	24 Mgm.
Tubing	Flint	Undeterminable trace	Unweighable	8.25 Mgm.
Tubing	Flint	.....	1.2 Mgm.	....
Tubing	Flint	.....	4.0 Mgm.	22.5 Mgm.
Tubing	Flint	.....	2.5 Mgm.	43.5 Mgm.
Tubing	Flint	.....	0.62 Mgm.	....
Tubing	Flint	.....	2.5 Mgm.	31.5 Mgm.
Tubing	Flint	.....	3.0 Mgm.	27.5 Mgm.
Tubing	Flint	.....	3.1 Mgm.	....
Tubing	Flint	.....	3.5 Mgm.	24.0 Mgm.
Tubing	Flint	.....	Unweighable	9.25 Mgm.
Tubing	Flint	Undeterminable trace	Unweighable	6.5 Mgm.
Tubing	Flint	.....	Unweighable	20.0 Mgm.
Tubing	Flint	.....	Unweighable	17.5 Mgm.
Tubing	Amber	.....	Unweighable	2.65 Mgm.
Tubing	Amber	.....	Unweighable	2.0 Mgm.
Tubing	Amber	.....	8.0 Mgm.	56.5 Mgm.
Tubing	Amber	.....	1.5 Mgm.	22.5 Mgm.
Tubing	Amber	.....	3.0 Mgm.	27.5 Mgm.
Tubing	Amber	.....	4.0 Mgm.	19.0 Mgm.
Tubing	Amber	.....	5.0 Mgm.	12.5 Mgm.
Tubing	Amber	.....	8.0 Mgm.	25.0 Mgm.
Tubing	Amber	.....	10.0 Mgm.	57.5 Mgm.
Tubing	Amber	.....	Unweighable	7.5 Mgm.
Tubing	Amber	.....	Unweighable	7.8 Mgm.
Tubing	Blue	.....	0.15 Mgm.	1.8 Mgm.
Bottle	Flint	.....	0.45 Mgm.	....
Bottle	Flint	.....	0.59 Mgm.	....
Bottle	Flint	.....	0.39 Mgm.	....
Erlenmayer flask	Flint	.....	0.0107 Mgm.	....
Test tubes	Flint	Undeterminable trace	0.28 Mgm.	....
Beaker	Flint	Undeterminable trace	3.0 Mgm.	....
Beaker	Flint	.....	Unweighable	3.3 Mgm.
Beaker	Flint	Undeterminable trace	Unweighable	18.5 Mgm.
Beaker	Flint	Undeterminable trace	Unweighable	13.0 Mgm.

No definite information can be obtained regarding the possible formation of spicules by a glass, from its working qualities under the flame. In the experience of some workers, the hard glasses appear to suffer surface scaling under the influence of the moisture and heat used in autoclaving, whereas in the experience of others, the more easily worked and more soluble glasses yield spicules by surface erosion due to solution of the alkaline radicle of the glass.

PHARMACEUTICAL RESEARCH LABORATORY,
H. K. MULFORD COMPANY.

ECONOMIC BOTANY AND CHEMICAL INDUSTRY.*

BY J. B. FARMER.

The events of the last few years have served to emphasize the need of looking more fully than heretofore into the best means of utilizing vegetable products as raw materials for industry, or of investigating their amenability to chemical treatment. We are mainly dependent upon plants for the great sources of our material wealth, and, indeed, plants (and in a secondary sense animals also) represent the main real revenue of the world, inasmuch as they are practically the chief storers of the energy that reaches us from the sun.

Few people sufficiently visualize our absolute dependence on the plants for the sheer necessities of life, or realize how urgent is the demand for investigations which will enable us not only to increase our wealth, but also give us a further measure of control over the sources of, and the conditions that affect, this plant revenue. The need for such investigation begins at the bottom. We have much need for stocktaking. At home there is, for example, a problem why some grass fields will fatten stock, and others not. Such fields are known in most grazing districts, but no really satisfactory explanation of their excellence is forthcoming. Superficial reasons, so-called, are common enough, but the fact that such fields are often surrounded by others apparently similar but of greatly inferior value should give pause enough to those who are ready with facile solutions of a difficult problem—or, rather, congeries of problems. Indeed, the soil and the grass that grows on it still constitute a relatively open field of research. Chemical analyses of soil go a

*From *Jour. Soc. Chem. Industry*, May 15, 1920.

little, but only a little, way. The complex physical and physico-chemical conditions and the relation of the plant roots to the substratum, and the changes that may be induced in the herbage itself, are very little understood; indeed, it would be almost true to say that the real problems have as yet scarcely been formulated. Hall and Russell in this country have emphasized the importance of the physical texture of the land. Russell and his collaborators at Rothamsted have done first-rate pioneer work in investigating the importance of the inter-relations of protozoa and bacteria in connection with soil fertility, and during the last three or four decades we have come to recognize that the problems of fertility are not likely to be elucidated by the older test-tube chemistry. They demand for their analysis chemists with a biological training and outlook, as well as biologists with a corresponding equipment in chemistry and physics. At present the two branches of science are often undesirably divorced although, largely owing to pestilent systems of examinations, a lack of biological training among chemists is far more common than is a corresponding ignorance of "physical" science with biologists, at any rate those on the physiological side. It is not, of course, suggested that every student should attempt to *specialize* in both of these great branches of science, but it is certainly a bar to progress that a student of the one should continue to be entirely ignorant of the more fundamental principles of the other. Those who are cognisant of the facts will be able of their own knowledge to supply examples enough during the late war—examples that would have been humorous, had the consequences not been fraught with too much gravity at the time.

One of the happier developments arising out of the war consists in the greatly increased recognition in this country of the value of science to industrial enterprise, and this is becoming as prominent in the biological as in the chemical and engineering worlds. Botany in its various branches is in a position to render very important services at the present time, and the supply of properly trained young men is as yet quite inadequate to take advantage of the new situation that has arisen. The exploitation of oil, rubber and other tropical products, the fermentation industries—indeed, all connected with the utilization of plants and plant products, afford large and profitable scope for scientifically directed industrialism. It is the business of the botanist not merely to find the raw material, but to improve it by careful breeding, to defend it from the attacks of

enemies, both animal and vegetable, and to investigate the conditions under which the yield of the desired product can be improved, whether by appropriate modification of the environment or by breeding. As the nature of the problems becomes more clearly recognized the methods of cultivation, selection and dealing with the raw material improve. Breeding, which used to be a sort of hit-and-miss business, is now becoming more and more an exact science, and although, owing to the tangled mass of factors involved, immediate success in a particular direction cannot always be predicted, at any rate we do not know how to attack the matter. Thus it is that in the more direct cases it is now possible with comparative certainty and rapidity to achieve results which formerly could only be secured by an immense waste of time, material and, of course, expense. Intelligent breeding demands a wide outlook over the many aspects presented by any single organism, but this fact is still unappreciated by too many business men. To give but one example, one often hears of high expectations being entertained that races of rubber trees can easily be produced which shall give high yields of caoutchouc, shall be immune to the attacks of disease, and, in short, shall possess all sorts of desirable qualities that, unfortunately, are but seldom combined in a single individual. Such expectations are entirely unreasonable, at any rate for so long as we continue to remain ignorant of the physiological significance of latex in the tree, of the origin and significance of caoutchouc formation, as well as of the other substances that occur along with it. Possibly it may turn out that there exists a significant connection between the caoutchouc and the troublesome resin which seems invariably to accompany it in all rubber yielding latices. The destiny of the oxygen during the transformation from carbohydrates to rubber is in itself an attractive, and perhaps a very fundamental, problem.

The matter of immunity to fungal and other disease-producing organisms is of the widest possible interest. In our own cultivated crops the problem is ever arising. Why do Victoria plums suffer so badly from silver leaf (due to the fungus *Stereum*), and why do certain otherwise desirable varieties of potatoes fall victims to the attack of wart disease so that they cannot be grown at all in districts where the disease is present? It is plain that there is joint work here for the plant physiologist and the chemist. There will have to be "many knots unravelled by the road" before the secrets of

immunity are disclosed, and even if the final goal be distant the knowledge gained on the way thereto cannot fail to be very productive in all sorts of ways as yet entirely unsuspected.

Fortunately, however, there are many problems of far more simple type, some of which are being solved, and others seem ripe for solution. For example, both in the field and in the laboratory the amount of scientific work that is urgently needed in connection with cotton is stupendous, and the results will have an imperial no less than a national influence and significance.

The vast sums of money which the great cotton industry is setting aside for scientific research is proof enough that the leaders are alive to the issues at stake. It is with special pleasure that reference is here made to the prize offered by Messrs. Cross and Bevan for an essay on "The interconnection of Economic Botany and Chemical Industry." In the pages of this JOURNAL it would be superfluous to dwell on the advances in our knowledge of cellulose and its products which we owe to these investigators, but what they have done for cellulose can be repeated by others for many other raw products, to the great advantage of commerce, industry, and also, it may be hoped, to the investigators themselves. To the successful essayist who, in the opinion of the Council of the Society of Chemical Industry, has shown conspicuous merit there will further be awarded a research fellowship of £300 per annum tenable at the discretion of the Council for two or three years. This fellowhsip, the gift of Sir T. P. Latham, Bart., is particularly intended to promote the study of economic botany, especially in its bearings on chemical industry; but the founder has with great wisdom and foresight allowed great latitude as to the nature of the researches on which the recipient of the scholarship may engage. This enlightened action ought to serve to stimulate some of the best among the younger men and to direct their attention to the rich fields of investigation that are awaiting them. Rubber, indigo, tea, oils, vegetable proteins, bamboo and forest refuse, especially abroad, and a host of other products at once suggest themselves as suitable subjects, and it must not be forgotten that investigations not only of the main substances, but of the by-products also, as all experience abundantly proves, are of immense value from a material and scientific point of view. The foregoing are, however, only a very few of those that might be quoted. The large and increasing lines of production that depend on vegetable organisms and fermentation only call for

a passing mention, inasmuch as they have recently been so ably dealt with in this JOURNAL by Mr. Chaston Chapman. The demand for vegetable oils and fats is a growing one, and the sources of supply are likewise increasing, while chemical investigation has already shown how much can be done in rendering the raw oil suitable for foods and other purposes. But we are really only on the threshold of the wealth which the vegetable kingdom holds out to those who know how to grasp it. As in utilizing these things we are increasing the revenue, without, as in some of our large industries, depleting the capital of the world.

CAMPHOR PRODUCTION IN BRITISH EMPIRE.*

(Alfred Nutting, clerk in American Consulate General, London, England, April 11, 1920.)

The world's annual requirements and the present practical monopoly of production by Japan of camphor, together with the present high price and increasing demand, have drawn attention to the possibilities of profitable cultivation of camphor in other countries and particularly within the British Empire.

Prof. P. Carmody, F.I.C. (late Director of Agriculture, Trinidad), discusses the situation in the *Times Trade Supplement* of April 10. He points out that refined camphor is now about 2s. ($0.49) per ounce and 23s. 6d. ($5.72) per pound, whereas five years ago it was per pound little over the current price per ounce; and although there are, or have been, great fluctuations, the price may rise further unless increased production is assured.

Commercial camphor, he states, chiefly originates in Formosa, but as "the camphor is obtained there by distillation of the wood the annual destruction of trees must be very considerable, and this may account for the reports of diminishing supplies." It is estimated that 10,000,000 pounds of camphor are required by the world annually. Other present sources are the Fukien Province of China, Shikoku and Kiushiu Islands in Japan, Cochin China, Sumatra, Java and Borneo.

Results Already Obtained in British Colonies.—In 1852 the tree was introduced into Ceylon, but little more was done until in 1893 a supply of seeds was obtained from Japan, and 1,000 trees

* From *Commerce Reports*, MAY 4, 1920.

were grown therefrom, from which, in 1901, the yield of solid camphor from fresh prunings was about $1\frac{1}{2}$ per cent. "It is estimated," Prof. Carmody states, "that the yield of prunings (6 to 8 inches long), would amount to 56,000 pounds per acre per annum, and that with camphor at 2s. per pound the net profit per acre per annum would amount to £74 ($360.00)." In 1906 there were over 100 acres devoted to camphor growing in Ceylon, but the cultivation was not commercially successful, as less than 1 ton of crude camphor was harvested.

At the present time experiments, with satisfactory distillation tests, are being carried out in the Federated Malay States, but in Mauritius the oil yielded is not the camphor of commerce.

In 1906, Prof. Carmody states, some 50 trees in Trinidad were transplanted to a better soil, with the result that "The growth has been quite satisfactory and a normal yield of solid camphor has been obtained on distillation," and in Dominica trees "obtained from Trinidad in 1911 have made satisfactory growth and have yielded solid camphor."

Requirements of Successful Cultivation.—In the matter of successful cultivation, he advises that "seeds or seedlings from trees that yield no solid camphor must not be used. Stiff clay soils must be avoided. Not more than 300 trees to the acre should be grown in good average soil, or not less than 12 feet apart in hedgerows, and a sufficient area (from 100 to 500 acres if possible) for economical distillation. When the trees are 4 or 5 years old they can be clipped, and thereafter three or four times a year."

Finally, he expresses the opinion that "the successful cultivation of camphor within the Empire is no longer doubtful," and "the reported depletion of native forests offers great inducements for further efforts," particularly in view of present high prices.

NOTE ON OPIUM POISONING.*

By H. E. Hankin, M.A., D.Sc., and D. Chatterji.

During the last three years stomachs, with their contents, of fifty-three persons have been examined in this laboratory, in which the history of symptoms and other evidence obtained by the police indicated that opium was the cause of death.

*From *The Analyst*, May, 1920.

The results of analysis were as follows: In one case no opium was detected, but opium was found in the viscera of another person who had been poisoned at the same time; in four cases the results of analysis were consistent with the presence of traces of opium; in twenty cases traces only of opium were detected; in nine cases opium was detected in small quantity; in ten cases opium was detected in medium quantity; in nine cases opium was detected in quantity.

By the term "small quantity" we mean that the residue obtained from a Stas-Otto extract gave color reactions about as strongly as would the Stas-Otto extract of 7 Mgm. of Indian opium of 2 per cent. morphine content. The term "medium quantity" similarly corresponds to about 15 Mgm., and "detected in quantity" corresponds to 20 or more Mgm.

Thus there was a clearly negative result in one case. Out of the remaining fifty-two cases, in twenty-four opium was either detected in traces or the tests were responded to so faintly that no definite statement could be made as to the absence or presence of the poison. That in such a large proportion of the case opium should only be detected in traces appears to be in accord with results obtained by other observers (see Witthaus, "Manual of Toxicology," second edition, p. 980).

The only tests we have found to be of use in testing for opium in viscera are the following:

(1) *The Porphyroxin Test.*—We have carried out this test on several thousand extracts of viscera and other substances without ever getting a well-marked reaction, except in cases in which it was probable, on other grounds, that opium was present. On the other hand, a faint pinkish color occurs not infrequently in the absence of opium.

(2) *The Husemann Reaction.*

(3) *The Urotropin or Formaldehyde Reaction.*

This last-mentioned test has been used as a colormetric test for morphine in viscera (*Analyst*, 42: 227, 1917). But, in our experience, there are grounds for doubting whether either this test or any other known to us can be depended on to give reliable colormetric result. The viscera are always sent to us preserved in alcohol. In the hot Indian climate it often happens that much decomposition has set in before the viscera are placed in alcohol. With such viscera we find that if an extract responds strongly to one of the above three

tests there is no certainty that it will respond strongly to the others. The extent of this discrepancy is shown by the following table. It refers to analyses of thirty-one stomachs, three specimens of vomit, one of liver, and one of urine, a total of thirty-six specimens. In each case the history of symptoms, etc., had pointed to opium poisoning:

Reaction given by the Urotropin Test.		Reactions given in the same case by Porphyroxin Test.	Husemann Test.
Strong in 8 cases	Strong	2	7
	Medium	5	0
	Negative or Doubtful	1	1
Medium in 16 cases	Strong	4	3
	Medium	12	13
	Negative or Doubtful	0	0
Doubtful in 6 cases	Strong	0	1
	Medium	5	4
	Negative or Doubtful	1	1
Negative in 6 cases	Strong	0	0
	Medium	6	6
	Negative or doubtful	0	0

Thus, in eight cases in which the urotropin reaction was strong, the porphyroxin reaction was only given strongly in two. In six cases the urotropin test gave a negative result, and in each of these the extract reacted with medium strength to the porphyrodin and Husemann tests. There can be little doubt that the cause of the occasional failure of the urotropin test is the inevitable presence of impurities in the extracts. It appears to be particularly difficult to get a pure extract in cases of opium poisoning. If an extract has a yellowish color there is a presumption, in our experience, that it is going to respond strongly to the tests for opium,

When dealing with highly decomposed viscera preserved for a fortnight or more in alcohol, no amount of washing with ether or with ether and chloroform will so purify the acid solution that it will not allow impurities to pass into the solvent when made alkaline. Repeated washing of the acid solution with ether is likely to result in the porphyroxin test yielding a negative result, and a valuable piece of evidence will thus be lost. Hence, in carrying out the Stas-Otto process, we wash the acid solution once only with ether and chloroform. It is advisable to add these solvents separately.

One part of chloroform is first added, then about three parts of ether, then a piece of litmus paper, and lastly, a few drops of ammonia. The mixture is then immediately shaken. We find that chloroform and ether thus used yield a purer extract than either an ethyl acetate-ether mixture or amyl alcohol.

GOVERNMENT LABORATORY, AGRA, INDIA.

JAMES E. BARTLETT.

The subject of this sketch, James E. Bartlett, has recently been elected President of Parke, Davis & Co., to succeed the late Frank G. Ryan. The elevation of any man to such a commanding position as the executive head of the leading pharmaceutical manufacturing corporation in the United States with its numerous branches scattered throughout the world, is worthy of more than a mere passing comment, as it is no slight compliment to the individual and is indicative of his personal qualifications and exceptional ability.

James E. Bartlett commenced his business career, while only a lad, as a clerk with Marshall Field & Co., of Chicago. After spending a year or two in this establishement at a nominal salary, with scant prospects for material advancement, he decided to leave Chicago and seek success elsewhere. He came to Detroit in 1889 and sought employment with Parke, Davis & Company. Although then but a mere youth, he was detailed as a salesman on the road, at which he made good. After spending a year or so in selling pharmaceuticals, he recognized, of his own accord, the need for a better acquaintance with the art of pharmacy and the advantages that might accrue to him from a more intimate knowledge of materia medica, even though he continued to apply his special efforts to the commercial side of the drug business. With this thought in mind, he temporarily left Parke, Davis & Co. and came to Philadelphia to attend the Philadelphia College of Pharmacy. On returning to Detroit he resumed his employment with that firm and spent several months in the various laboratory departments and was thus enabled to dovetail the knowledge acquired at the College with practical manufacturing experience.

His fidelity and ability won continual advancements and his promotions quickly followed each other and he had an unusual wide

J. E. Bartlett

range of experiences in these various assignments. After serving as Assistant Foreman of the Pill Department, he was made Buyer, then Chief of the Fire Department, then Assistant Superintendent, and later Superintendent of the Laboratory; the latter important position he filled for a number of years.

In order to serve their customers more promptly and to increase their business in the Middle West, the house determined in 1896 to establish a branch house in Chicago. Mr. Bartlett was selected as the manger of this office and in a very few years the Chicago branch, under the impulse of his management, became an important center of the business.

In 1913, Mr. Bartlett was brought back to the Detroit headquarters to assume an executive position in the management. He was placed in charge of the selling division of the business and the whole organization soon felt the force of his dynamic personality. New sales methods were inaugurated; new products were pushed to the front; and the hum became more energetic and in harmony with the enthusiasm of the man at the helm.

A strong, self-reliant man, full of initiative and enthusiastically aggressive, Mr. Bartlett has always shown a natural capacity for leadership such as few men possess. His election to the presidency of the corporation brings him to the top after a steady climb up the ladder during a period of thirty-one years. Having grown up in the establishment, being personally acquainted with the details of the various departments and the personnel of the large body of employees, he is well equipped for the arduous duties now imposed. He is essentially a Parke, Davis & Co. product and typical of the business that he has so faithfully served.

In recent years Mr. Bartlett has taken an active interest in the American Drug Manufacturers' Association and at the meetings of that forceful organization he is a commanding figure. As chairman of the Committee on Commercial Travelers he presented a very interesting report. He is a member of the Executive Committee and has been a factor in shaping the policies of the Association in recent years.

He has been a regular attendant at the meetings of the National Wholesale Druggists' Association, and is well known to the wholesale and jobbing drug trade.

Since he became president of Parke, Davis & Company, he has initiated a number of forward-looking policies and has already made

his impress upon the organization. He has established an attendance bonus for the rank and file of employees and increased the annual vacation allowance; in addition he has provided that the older employees receive a cash vacation allowance annually. By one means or another he has impressed his personality and succeeded in increasing the enthusiasm and loyal support of the house by everybody concerned therewith.

In a recent editorial contibuted to the *Oil, Paint and Drug Reporter*, Mr. Bartlett demonstrates that he is an optimist and has no sympathy with the calamity howlers. He holds that there is no cause for the alarmist or for a pessimistic view of the industrial and financial condition in the United States. In his opinion "There is not, at the present time, a serious cloud on the horizon, so far as the permanent future prosperity of the drug industry is concerned."

He has the real spirit and is representative of the type of men that must be the leaders in American commerce.

CURRENT LITERATURE.

SCIENTIFIC AND TECHNICAL ABSTRACTS.

OIL OF RUBIEVA MULTIFIDA.—A specimen of the essential oil of *Rubieva Multifida*, distilled experimentally by the W. J. Bush Citrus Products Company, at National City, California, from the wild plants growing in the state, was examined.

The oil is light yellow in color and has an odor suggesting anise and terpenes. $d_{25°}^{25°} = 0.8542$. $[\alpha]_D = +35.75°$ (100 mm. tube).

On the first distillation about 60 per cent. comes over at 37–40° (under 3 mm. pressure). On repeated refractionation, about 85 per cent. of the oil was found to consist of a terpene fraction which, after rectifying over sodium, boils at 169–171° (under atmospheric pressure). $d_{20°}^{20°} = 0.8507$, $[\alpha]_D = +46.4°$ (100 mm. tube).

The terpene fraction polymerizes rapidly on boiling at atmospheric pressure, has an odor resembling that of phellandrene, and yields a nitrosite melting at 103–104°. Hence it consists largely of β-phellandrene,

From the higher boiling portion of the oil anethole was separated. A resinous residue, probably polymerized phellandrene, was left on distillation. E. K. Nelson, Essential Oils Laboratory, Drug

Division, U. S. Bureau of Chemistry, Washington, D. C. (through *J. Amer. Chem. Soc.*, June, 1920).

DETECTION OF MINUTE QUANTITIES OF PETROLEUM SPIRIT IN VEGETABLE OILS.—A number of methods for the detection of petroleum spirit in vegetable oils have been proposed. A careful study of these has shown that they are not satisfactory, but it has been found that Nastjukoff's formolite reaction may be applied successfully for the purpose as follows:

The oil (50–100 g.) is saponified by means of potassium hydroxide solution. Distilled water and pure calcium chloride solution are added, the liquid distilled by means of steam, and the distillate treated with 40 per cent. formaldehyde solution and a few drops of concentrated sulphuric acid. A reddish brown film coloration on the surface of the liquid, gradually changing to deep yellow, indicates presence of petroleum spirit. If a few drops of the distillate are added to water, a brilliant interference ring of optical waves is produced on the surface of the water; this ring becomes almost invisible after standing for some time and disappears completely on heating. With soya bean oil the ring does not change, even on heating. The above process is capable of detecting traces of petroleum spirit in vegetable oils, and may be made the basis of a quantitative method, the formolite precipitate being weighed after drying at 110–115° C. Masahiro Aida. (From *J. Soc. Chem. Industry*, June 15, 1920.)

CYSTINE REACTION.—Cystine, whether present as a cystine calculus or in any other form, can be rapidly and easily identified by the following simple test: Place a small portion (not more than a milligram) on a slide, moisten with a droplet of strong hydrochloric acid (s. g. 1.17 to 1.18), and examine under the microscope without covering with a cover-glass; an abundance of groups of prismatic needles appear. Add a droplet of water; the slide clears. Evaporate at a gentle heat to dryness, cool thoroughly, cover, and add a droplet of water; after a few moments hexagonal plates appear.—Denigés (*Bull. Soc. Pharm. Bordeaux*, 58, 8; through *Pharm. Jour.* and *Pharmacist*, July 3, 1920).

COLORLESS VARIETY OF MERCURIC IODIDE.—Mercuric iodide may be obtained, temporarily, in colorless crystals, as follows: About 10 Gms. of the salt is placed in a long tube, sealed at one end,

and connected with a large vessel at the other, and heated to 300–350° C. The pressure is suddenly reduced to about 7 mm., when the mercuric iodide sublimes into the large vessel and condenses as a white snow, which in a few seconds becomes rose-pink, and ultimately the usual bright red color. By cooling the large vessel previous to the experiment the sublimate may be caused to preserve its colorless form a longer period. The yellow variety of mercuric iodide becomes colorless at the temperature of liquid air.—G. Tamman (*Zeitschr. anorg. Chem.*, 1920, 109, 213; *J. Chem. Soc.*, 1920, 118 (11), 315; through *Pharm. Jour. and Pharmacist*, July 3, 1920.)

Ferric Chloride Test for Diacetic Acid.—When testing the urine of a patient who had been taking sodium bicarbonate for gastric hyperacidity, Maxwell noticed a red color with ferric chloride similar to that obtained with diacetic acid. As there was no reason in this particular case to suspect acidosis and as the reaction of the urine was intensely alkaline, it occurred to Maxwell that the sodium bicarbonate might be the cause of the red color with ferric chloride. Repeated tests showed that if sodium bicarbonate were added to normal urine and then ferric chloride, the urine became a similar red color to that obtained in the presence of diacetic acid. In further experiments the urine of the author after ingestion of approximately 6 Gms. of sodium bicarbonate during a period of twenty-four hours, also gave a red color on the addition of ferric chloride. Presumably the ferric chloride reacts with the bicarbonate to form ferric hydroxide, which dissolves in the excess of ferric chloride to give the red color, carbon dioxide being evolved during the reaction. The more bicarbonate present, the deeper the red color produced. In all cases of acidosis which are being treated with alkalies, it is essential to exclude the possibility of sodium bicarbonate being responsible for the development of the red color when ferric chloride is added to the urine. If this precaution be overlooked, the dosage of alkali may be increased in the hope of overcoming an acidosis which in reality does not exist. (*Med. Jour. of Australia, Sydney*, May 15, 1920; through *Jour. Amer. Med. Assoc.*, July 17, 1920.)

Detection of Methyl Alcohol in Spirits: P. Hasse.—The sample is distilled and 0.5 Cc. of the distillate (containing not more

than 0.025 Cc. of alcohol) is mixed with 1 Cc. of 5 per cent. potassium permanganate solution, 2.5 Cc. of dilute sulphuric acid (sulphuric acid, 19 Gms., water 200 Cc.), and, after standing two minutes, the mixture is decolorized by the addition of 1 Cc. of 10 per cent. oxalic acid solution. To 0.5 Cc. of this mixture are then added 1 drop of peptone solution (= 2.5 Mgm. of peptone), and 1 Cc. of sulphuric acid containing iron (0.05 Gm. of iron alum dissolved in 1 Cc. of water and added to 300 Gms. of sulphuric acid). A deep blue color is obtained if the spirit contained 1 per cent. of methyl alcohol; a red-blue color is produced by 0.3 per cent. of the alcohol. Pure ethyl alcohol gives a yellowish red coloration with the test. If an indication of the presence of methyl alcohol is obtained, it should be confirmed by the morphine and magenta-sulphurous acid tests. (*Pharm. Zentr.*, 61: 177–182, 1920; through *J. Soc. Chem. Ind.*, 39: 345A, 1920; through *The Analyst*, June, 1920.)

Detection of Cinnamic Acid.—Traces of cinnamic acid, either free or as a salt or ester, can be detected by means of a ferric salt and hydrogen peroxide. To every 2 Cc. of a solution of cinnamic acid or a cinnamate one drop of solution of ferric chloride is added and the mixture heated to boiling; one drop of hydrogen peroxide is then added and the tube shaken for a few seconds; if no odor of benzaldehyde is developed the tube is agian heated to boiling. It is possible by this means to detect 0.02 Gm. of cinnamic acid in a liter of water; if the amount present exceeds 0.1 liter the quantity of ferric chloride and hydrogen peroxide may be doubled. Cinnamic esters should be boiled with 5 Cc. of water and two or three drops of solution of soda for twenty to thirty seconds and acidified with diluted sulphuric acid; the ferric chloride is then added, the mixture boiled, the hydrogen peroxide added, and again boiled, when the odor of benzaldehyde will easily be detected. A similar procedure is adopted with balsam of Peru or tolu. (M. G. Denigès, *Bull. Soc. Ph. Bordeaux*, 57: 209; through *The Pharm. Jour. and Pharm.*, Feb. 14, 1920.

Serum Test for Echinococcus Disease.—Gasbarrini applied the test by the intradermal technic and obtained a positive response in all his twelve cases of hydatid cyst, except in one case in which the cyst had suppurated and thus had ceased to be "active." He commends the ease and harmlessness of the test. It is made with serum from bovine hydatid cysts, filtered; after addition of one

drop of phenol to 20 Cc. of the fluid it is set on ice. It keeps active for about a month. Giani obtained satisfactory results also with the Abderhalden test applied to human and bovine serum from subjects with echinococcus disease, and it was positive in seven of Gasbarrini's twelve cases. After surgical intervention the intradermal reaction veers to negative. (*Jour. Amer. Med. Assoc.*, Feb. 21, 1920.

CULTURE MEDIUM SUITABLE FOR GROWTH OF ORGANISMS USED IN VACCINES.—Various types of culture mediums were prepared and examined by Norris with a view to the determination of their nutritive value as regards the growth of *B. typhosus* for vaccine purposes. Of the various meat mediums at present in use, those prepared by means of a tryptic digestion appear to be much more nutritive than an ordinary beef peptone medium or than those porpared by acid hydrolysis. The addition of nutrose and casein appears to have no great influence on growth unless added to a particular non-nutritive medium. The addition of a comparatively small amount of hydrolyzed nutrose to a poor medium increases the growing power to the level of an ordinary trypsinized medium. Glucose seemed to inhibit growth. Mediums obtained by the tryptic hydrolysis of nutrose, press cake from ground nut, and casein give material equal in nutritive value to that obtained from meat. In examining the nutritive value of these mediums, concentration of substrate appeared, within limits, to be of greater importance than time of hydrolysis. (From *Indian Jour. of Medical Research*, Calcutta, Oct., 1918, through *Jour. Amer. Med. Assoc.*, Feb. 28. 1920.)

POISONOUS ACTION OF BORAX ON PLANTS.—*Circular 84* of the United States Department of Agriculture gives an account of the extensive injury done by fertilizers containing notable amounts of borates. The cessation of imports of German potash brought about active search in the United States for sources of the material and several such were found, among them the deposits in Searles Lake, California. This contains notable amounts of borates, equivalent in some samples to 6.25 per cent. anhydrous borax in the potash as marketed. Large quantities of this potash were used in making complete fertilizers and applied to fields in which especially potatoes and cotton were grown. Great damage resulted, and the

investigations of the Department of Agriculture have shown that the borates were to blame. The salt was found to be particularly inimical to germination. The manufacturers of the Searles Lake potash have recognized the danger and are now marketing a product containing very little borate. It is evident that any new source of potash will have to be carefully examined for this objectionable compound. H. L.

RAPID METHOD OF ESTIMATING LEAD IN CASSIA OIL.—O. F. Lubatti. (*J. Soc. Chem. Ind.*, 39: 35–36T, 1920.)—Cassia oil exported from China is contaminated with lead derived from the leaden vessels in which it is sold. For the rapid colormetric estimation of this lead by means of ammonium sulphide 5 Cc. of the oil (or 2.5 Cc. if a preliminary test has indicated the presence of more than 0.025 per cent. of lead) are diluted to about 23 Cc. with 90 per cent. alcohol in a Nessler cylinder of narrow diameter (2.5 Cm.). The same amount of cassia oil free from lead is diluted in the same way in a second tube, 1 Cc. of ammonium sulphide solution added to each liquid, and a standard solution of lead in 90 per cent. alcohol (1 Cc. = 0.0001 Gm. Pb) is added to the blank until it matches the brown coloration of the sample under examination. The liquid is stirred three times after each addition of lead solution. The results thus obtained are slightly high, the average excess being 0.00018 Gm. The amount of lead usually present in commercial samples ranges from 0.04 to 0.06 per cent. In a test experiment, in which a pure oil was left in contact with bright lead in closed tubes, which were shaken at intervals, the maximum absorption of lead was 0.074 per cent., and was reached after one month. (From *The Analyst*, April, 1920.)

TESTING THE AMYLOLYTIC ACTION OF THE DIASTASE OF *Aspergillus Oryzae* (TAKA-DIASTASE).—S. A. Waksman (*J. Amer. Chem. Soc.*, 42: 293–299, 1920).—The various diastatic enzymes differ in their mode of action towards starch, particularly as regards the relative quantities and rates of formation of the intermediate and final products. In this sense it is convenient to differentiate between the amylolytic (liquefying) and the saccharifying powers of the commercial diastatic preparations. The measurement of saccharifying power has formed the subject of many exact researches but the measurement of amylolytic power leaves much to be desired in the

way of refinement, and this property is the essential one in the valuation of diastatic enzymes applied to the textile industry. The Lintner method for measuring the saccharogenic action should not be used for comparative studies of different enzymes, since the end products are not the same in all cases. Most of the methods hitherto employed for estimating the starch liquefying power depend on the use of iodine for determining the end-point, and the indications are somewhat arbitrary. In the method now described the end-point taken to indicate the complete destruction of the starch is the change of the opaque starch paste into a clear solution. To facilitate the recognition of this point it is found to be convenient to dye the starch with neutral red. About 50 to 100 Gms. of dry potato starch in a large porcelain dish are wetted with 100 Cc. of a 0.5 per cent. solution of neutral red; the starch is allowed to absorb all the color, and then washed repeatedly with water until the supernatant liquor remains almost clear. The dyed starch is then dried. For the test a 2 per cent. starch paste is made by stirring the colored starch with a little cold water, gelatinizing with boiling water, boiling for ten minutes, and making up to the required volume. The paste is introduced in portions of 10 Cc. each into large test-tubes, which are then placed in a thermostat at 40° C. When the correct temperature is reached, increasing quantities of the diastase solution are added to the tubes, and these are well shaken and replaced in the thermostat. The end of the reaction, indicated by the clearing up of the color, is best observed by comparing the liquefied and unliquefied tubes, holding the tubes in the light. The times (T) at which the various tubes become clear are recorded in conjunction with the quantities of enzyme solution (E) present, and it is found that E × T = *a* constant K. Then if F = enzyme value at 40° C.; D = dilution multiple of the original enzyme solution; t = standard time (30 minutes); E = quantity of diluted enzyme solution used; and T = the corresponding time of liquefaction

$$F\frac{30\text{ min.}}{40^\circ} = \frac{D.t}{E.T.} \text{ or } \frac{D.t}{K.}$$

In this way the results may be checked by taking the average of several tubes containing different amounts of enzyme. The method is particularly suitable for the study of enzymes which have a starch liquefying power rather large in comparison with the saccharifying power, as, for instance, "Take-diastase." (From *The Analyst*, April, 1920.)

DETECTION OF INDICAN IN URINE AND BLOOD.—A. Jolles (*Med. Klinik*, 15; 814, 1919; through *Chem. Zeit. Ubersicht*, 44: 37, 1920).—Instead of converting the indican into indigo according to the methods of Obermayer and Jaffé, the author recommends the following method: The indican of urine consists principally of potassium indoxylsulphate, which when submitted together with thymol to oxidation by means of ferric chloride yields 4-cymol-2 indolindolignon. This substance forms with one molecule of hydrochloric acid a deep violet dye, which is produced when the chloroform extract of the urine or blood is treated with thymol, fuming hydrochloric acid and ferric chloride. (From *The Analyst*, April, 1920.)

MICRO-METHOD FOR THE ESTIMATION OF ACETONE.—M. Richter-Quittner (*Biochem. Zeitsch.*, 93: 163–172, 1919; through *J. Soc. Chem. Ind.*, 39: 206A, 1920).—A micro-method in which 1 to 2 Cc. of urine and 1.5 to 3 Cc. of alkali need only be used. The urine is distilled once with steam in the presence of acetic acid and a second time with dilute sulphuric acid. Blood or plasma need only be distilled once, and instead of the steam, air is passed through the heated flask. The titration of the distilled acetone is carried out with $N/10$ iodine and $N/100$ sodium thiosulphate; 0.1 Mgm. of acetone in 100 Cc. can be estimated with accuracy by this method. The quantity of urine and blood used must not contain less than 0.04 Mgm. of acetone. (From *The Analyst*, April, 1920.)

CARAMEL.—G. P. Plaisance and Helen Monsch, of the Iowa State College and Agricultural Experiment Station, have studied the occurrence of furfural in caramel (*Jour. of Home Economics*, 1917, ix, 167–171). Caramel is used as a coloring, *e. g.*, in artificial vanilla extract, and is formed from sugar in cooking. Furfural, furfurole or furfuraldehyde is an heterocyclic aldehyde which is volatile in steam. It is somewhat toxic, thus 0.1 Gm. causes headache in man and 0.5 Gm. kills a cat or a rabbit. Some furfural is formed when sugars, especially cane sugar, are caramelized at a temperature ranging from 180° to 200° C.; the greatest production of furfural noted was 0.944 Gm. from 1 kilogram of cane sugar on carmelization for four minutes at 200° C. However, the furfural is completely expelled if the caramel be boiled with an equal amount of water for ten minutes in an open pan. No precautions to prevent the injurious action of furfural are necessary when the food is cooked in the presence of

water after caramelization, as in the preparation of cakes, frostings, and rice pudding. In candy-making the cooking should be conducted at as low a temperature as possible, since the yield of furfural increases with the temperature. Care should be taken to prevent caramelization in the baking of fruits; it is desirable to boil caramelized fruit syrups with an equal volume of water for ten or fifteen minutes before serving them.—(From *Jour. Franklin Institute* May, 1920.)

PROSOL, A NEW KETONE.—While engaged in an exhaustive examination of the grain of the proso (Russian) millet, with a view to determine its adaptability as a breadstuff and its possibilities as a food crop for the South Dakota west-of-the-river country, Professors B. A. Dunbar and E. R. Binnewies, of the chemistry department of State college, discovered an alcohol-ketone by-product which so far as they have been able to ascertain, has not been discussed in the literature pertaining to plant products. The product, pending its further examination, has been named "prosol."

The new alcohol is a most peculiar one, being one of those which are insoluble in water. The tentative molecular formula $C_{24}H_{36}O_2$ has been assigned to the product.

The grain upon which the study was based was raised upon the State college farms from specially selected white seed derived by selection from mother seed obtained in Russia by Dr. N. E. Hansen. (*Journal of the American Chemical Society*, March.)

NEWS ITEMS AND PERSONAL NOTES.

THE NATIONAL RESEARCH COUNCIL.—The National Research Council has elected the following officers for the year commencing July 1: Chairman, H. A. Bumstead, professor of physics and director of the Sloans Physical Laboratory, Yale University; First Vice-Chairman, C. D. Walcott, president of the National Academy of Sciences and secretary of the Smithsonian Institution; Second Vice-Chairman, Gano Dunn, president of the J. G. White Engineering Corporation, New York; Third Vice-Chairman, R. A. Millikan, professor of physics, University of Chicago; Permanent Secretary, Vernon Kellogg, professor of biology, Stanford University; Treasurer, F. L. Ransome, treasurer of the National Academy of Sciences.

The Council has recently received an endowment of $5,000,000 from the Carnegie Corporation, part of which will be spent in the erection of a suitable building in Washington for the joint use of the Council and the National Academy of Sciences. Other gifts have been received for the carrying out of specific researches.

It is now beginning to function and has issued as Bulletin No. 2 a list of the research laboratories in industrial establishments of the United States. This bulletin gives a brief account of the organization and personnel of more than three hundred of such laboratories now maintained by our industries. It is interesting to us to note that many of the pharmaceutical manufacturers are listed in this catalogue.

The Council has likewise assisted in the organization of the Plant Protective Institute. The purpose of the Institute is to promote general welfare by supporting and directing scientific research on the pests of crops, shade trees, and ornamental plants, and on the methods of their control, and by furthering coöperation between the scientific investigators and the manufacturers of chemicals and appliances so as to effect standardization and economy.

CATALOGUE OF THE MONSANTO CHEMICAL WORKS.—The Monsanto Chemical Works, of Saint Louis, have issued a unique catalogue of their products. It is elegantly printed on tinted high-grade book paper with cover embossed in bronze and is an excellent piece of work from the view-point of the printers art. It is well illustrated with views of their several chemical plants and offices and from the front page beams in half tone the genial countenance of Mr. John F. Queeny, the founder and at present chairman of the board of directors to whose untiring energy and enterprise the success of this company is ascribed.

This catalogue is unique in that it contains no prices whatever but shows a list of the products, each being presented in a monographic style in which is set forth the chemical composition, physical properties and the standards, or specifications for purity, adopted by these manufacturers for their individual products. It is useless to state that these indicate a very high standard. The list includes many chemicals of medicinal use and pharmaceutical interest and of a great variety and types of manufacture. Among the coal-tar derivatives we may mention acetanilid, acetphentidin, acetylsalicylic acid, phenol, phenolphthalein, salicylic acid, saccharin,

salol and the newer chlorine derivatives used as antiseptic wound dressings and as germicides.

They are also large producers of the mineral acids, chrome alum, and are well known in the trade for their development of the manufacture of glycerophosphates and the excellence of their productions of these medicinal chemicals. They also manufacture caffeine, coumarin, and are constructing a plant for the manufacture of synthetic camphor in large quantities. It is now well known that for the manufacture of celluloid and many similar products of industrial importance the artificial camphor serves as well as the natural. This will release for use in pharmaceutical preparations an enormous amount of the natural camphor which has theretofore been consumed in these industries and should result in further declines in price.

The success that has attended the efforts of this company to produce in the United States medicinal and fine chemicals which, before this company was founded in 1901, had been largely imported from Europe, has been as noteworthy as deserved and we consider this as a tribute to the skill, energy and indomitable enterprises and foresight of its management.

H. K. MULFORD CO.'S PICNIC TO EMPLOYEES.—For a number of years the H. K. Mulford Company have been giving an annual picnic to their employees and their families. This year this event, which has been termed "Mulford Day," was observed on June 19th, last. Special trains carried the excursionsists to the extent of several thousand to Glenolden. The day was given over to athletic events, music and dancing. Many of the visitors took advantage of the opportunity of inspecting the fine collection of horses in the stables, the biological laboratory and the drug gardens at Ridgway. Ample refreshments were served and the participants thoroughly enjoyed the occasion.

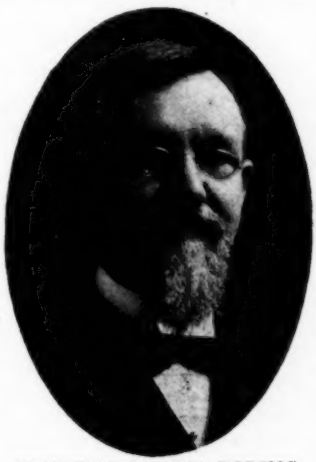
LEHN & FINK, INC., IN NEW BUILDING.—Lehn & Fink, Inc., who for many years conducted their business from their New York Office, 120 William Street, have now moved up town into their newly constructed modern steel and stone building at Greenwich, Morton and Barrow Sts. This is a seven-story fire-proof structure, and will, the firm thinks, provide the room which they need for the enormous development of their wholesale drug, manufacturing, and importing business.

OBITUARY.

EDWIN McCURDY BORING.

Edwin M. Boring, who died at his home in Philadelphia, June 22, 1920, was the son of John Dobbins Boring and Catherine McCurdy Boring, and was born at Lancaster, Penna., October 24, 1839. His boyhood days were spent in his home town, where he attended High School. Thereafter, about 1857, he worked for a time in Welchen's Drug Store, in Lancaster, and for a few months in Philadelphia, after which he returned to Lancaster.

He responded to Lincoln's call for 75,000 volunteers, and entered the three months' service with the Lancaster Fencibles, April 18, 1861. At the expiration of the three months he re-enlisted in Company E, 79th Pennsylvania Volunteers, first as private, and was commissioned First - Lieutenant June 19, 1864. He took part in a number of the great battles of the war, at Murfreesboro, Chickamauga, etc. He was mustered out July, 1865. As a member of the Executive Committee of the State of Pennsylvania Chickamauga-Chattanooga Battlefields Commission he assisted in the erection of the monument at Chickamauga Park to the 79th Pennsylvania Volunteers.



EDWIN McCURDY BORING

After the war, September 4, 1865, he came to Philadelphia, and entered the employ of Edward B. Garrigues, at 10th and Fairmount Ave. During the same year he matriculated at the Philadelphia College of Pharmacy and graduated in the class of 1867. During the summer of 1866 he studied botany under Dr. Horatio C. Wood, of the University of Pennsylvania, then located at 9th and Chestnut Sts. He was elected to the Board of Trustees of his Alma Mater in 1868, and continued a member until the time of his death. In 1868 he formed a partnership with Mr. Garrigues, which continued until the time of the latter's retirement in 1887, when Mr. Boring became the sole proprietor. He continued this business until last year, when he disposed of it to his successor.

The deceased became a member of the American Pharmaceutical Association in 1867, and attended many of the annual conventions especially those of earlier years. He was one of the organizers of the Philadelphia Wholesale Drug Company, a member of the Pennsylvania State Pharmaceutical Association, and the Philadelphia Association of Retail Druggists.

October 8, 1873, Mr. Boring married Elizabeth Garrigues Truman, who died February 18, 1907. They had four children, all of whom survive the deceased. They are Edwin Garrigues Boring, Professor of Experimental Psychology in Clark University, Worcester, Mass.; Alice Middleton Boring, for the past two years Assistant Professor of Biology at the Union Medical College, Peking, China, and now appointed Assistant Professor of Zoology at Wellesley College, Wellesley, Mass.; Katharine Boring Rondthaler, wife of Dr. Howard Rondthaler, President of Salem College, Winston-Salem, N. C.; and Lydia Truman Boring, Assistant in the Psychiatric Clinic of the Home Service Section, S. E. Penna. Chapter, American Red Cross.

The deceased was a member of the Moravian Church, and took an active part in its affairs. As a citizen he stood for what is best in civic life; in the family his example as husband and father made for what is best in the home circle; his loyalty, sense of duty and obligation to pharmacy marked his life with success.

E. G. E.